interseroh ALBA

ALBA Group

# resources SAVED by recycling.

**A circular economy is an active contribution to protecting the climate and resources. In 2018, ALBA Group's recycling activities conserved around 31.9 tonnes of primary resources and prevented some 4.4 tonnes of greenhouse gas emissions.***

*Source: Fraunhofer UMSICHT

**ALBA Group**
ALBA Group operates within Germany, Europe and Asia. In 2018, the Group's divisions generated a turnover of around 2.1 billion euros and employed a total of around 8,000 people. This makes ALBA Group one of the leading recycling and environmental services providers and raw material suppliers worldwide.

**Fraunhofer UMSICHT**
Fraunhofer UMSICHT is a pioneer of sustainable energy and raw materials management, providing scientific results and transferring them to businesses, society and politics. Working together with partners, the dedicated team researches and develops sustainable products, processes and services that inspire. We want our developments to be economically successful, socially equitable and sustainable. The balance between these objectives is always at the forefront of our thinking. Based in Oberhausen, Willich and Sulzbach-Rosenberg in Germany, the institute in 2018 generated a turnover of more than 42.2 million euros with a staff of 529 persons. As one of 72 institutes and research units of the Fraunhofer-Gesellschaft, the leading organisation for applied research in Europe, we are a worldwide network and promote international collaborations.

resources® SAVED

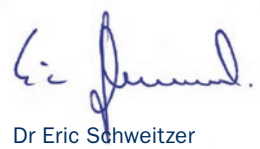
Dear Reader,

There is only a brief window of time to act before climate change becomes irreversible. While this isn't news to us at Interseroh, the global protests being organised by young people may well be what's required to raise awareness where it's needed. Suddenly, climate change has now become the top priority in terms of both press coverage and government policy. The German Government is discussing the idea of a carbon tax, has climate protection legislation in the pipeline and is pushing for a climate-neutral Europe by 2050 in the European Council.

From a resource-intensive, linear economy to a comprehensive closed-loop economy: reusing and recycling raw materials plays a key role in fighting climate change. This is a point made also by Federal Economics Minister Peter Altmaier at the General Assembly of the Federation of the German Waste, Water and Raw Materials Management Industry (BDE) in early June 2019. He is committed to bringing together lawmakers and industry to leverage the circular economy's potential in protecting the climate even more efficiently and comprehensively. We welcome this revitalisation of the climate protection debate, and the greater awareness of the topics of sustainability and recycling in the general population. This underlines the importance of our work and motivates us to redouble our efforts to achieving a sustainable turnaround in the use of resources. With next-generation sorting and reprocessing technologies, for example, it is becoming easier to commercialise the production of high-quality, customer-specific recycled raw materials. The fewer natural resources we extract from our planet and the more widespread material recycling becomes, the greater the reductions we can make in climate-polluting greenhouse gases.

This is the twelfth year that researchers at the Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT have calculated the environmental impact of ALBA Group's recycling activities. Once again, their results provide scientifically sound evidence for the critical importance of closed material loops for preserving the very basis of our existence. We must take this path and not stray from it – we owe it to future generations to do so.

We hope you enjoy reading this issue.
Sincerely,



Dr Axel Schweitzer

Dr Eric Schweitzer

Chairmen of ALBA Group plc & Co. KG

# Key factors for **climate protection**

Today, recycling is already an integral part of value chains. Increasing numbers of companies are now applying the climate- and resource-friendly closed-loop model to their businesses. The ALBA Group offers advice and assistance here: in recent years, we have measurably improved both the profitability and the environmental benefits of material loops by applying our state-of-the-art technologies. Sound numerical evidence for this is offered by the 'resources SAVED by recycling' study, which the Fraunhofer Institute for Environmental Safety and Energy Technology UMSICHT conducts each year for the ALBA Group.

Since 2018, the topic of climate protection has rarely been out of the headlines. From the 'Fridays for Future' youth movement to the International Monetary Fund (IMF), from community initiatives to the Intergovernmental Panel on Climate Change (IPCC), a new consensus has been achieved: climate change is seen as the biggest existential challenge of our time – and countering global warming as our most urgent task. The figures are alarming: according to a study published by the Organisation for Economic Co-Operation and Development (OECD), global resource consumption will nearly double by 2060 – from the current annual figure of 90 gigatonnes to 167 gigatonnes. This would result in a further dramatic increase in greenhouse gas emissions.

**Transitioning to a resource-efficient, closed-loop economy**

Take plastics, for example. In 2017, an estimated amount of 348 million tonnes of plastics were produced worldwide. Climate researchers estimate that worldwide production will rise up to 1.2 billion tonnes by 2050, resulting in a roughly 15 percent share of global carbon dioxide emissions.

The use of recycled raw materials paired with high-quality material recycling offers a powerful tool for breaking out of this negative spiral.

When compared with production using fossil-based raw materials, closed-loop management of plastics avoids the energy-intensive processes of crude oil extraction, distillation and polymerisation. Saving large quantities of finite resources means a relief of burden on the environment. The ALBA Group is helping to create a growing market for recycled materials by deploying innovative recycling processes and technologies, and a range of specialised services. This is another step towards achieving a turn-around in resource use and ensuring all materials are managed in the loop as efficiently as possible.

The tighter the integration between sustainable resource management and corporate value creation strategies, the greater the benefits for climate and resource protection.

**The 'resources SAVED by recycling' study**

Since 2007, the ALBA Group has commissioned the Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT to calculate the extent to which the Group's recycling activities have reduced the burden on the environment. To do so, the researchers calculate the volume of greenhouse gases plus biotic and abiotic raw materials saved compared with primary production. These 'abiotic' raw materials include nonrenewable primary resources such as ores, coal or sand, which are mined from the earth to produce a valuable material. Biotic raw materials include renewable primary resources such as wood. This comprehensive life-cycle analysis enables resource use savings and greenhouse gas reductions to be expressed to the nearest kilogramme. The 2018 study covers the material streams of plastics, metals, waste electrical/electronic equipment, wood, paper/paperboard/cardboard and glass.

# Overall findings

**5.6 million** **tonnes recyclables** were circulated by the ALBA Group.*

**31.9 million** **tonnes of primary raw materials** were saved.

**4.4 million** **tonnes of greenhouse gas emissions** were saved by the ALBA Group.

This is the same level of climate protection offered by 441,043 hectares of mixed forest – an area roughly equal to 620,000 football pitches.

The overall report findings are based on data from ALBA Group recycling activities in Austria, Germany, Poland and Slovenia. Individual figures given for specific material streams are based only on data from Germany.

* Evaluated volume in the study.

# “Recycling is not an **end in itself**”

This pioneering work requires the pooled expertise of a sizeable interdisciplinary team: in the Sustainability and Resources Management department at Fraunhofer UMSICHT, geoscientists work together with chemical engineers, landscape ecologists and industrial engineers. In 2007, this team developed a method capable of measuring the environmental benefits of the ALBA Group’s recycling work. Since then, this method has been continuously improved and refined.

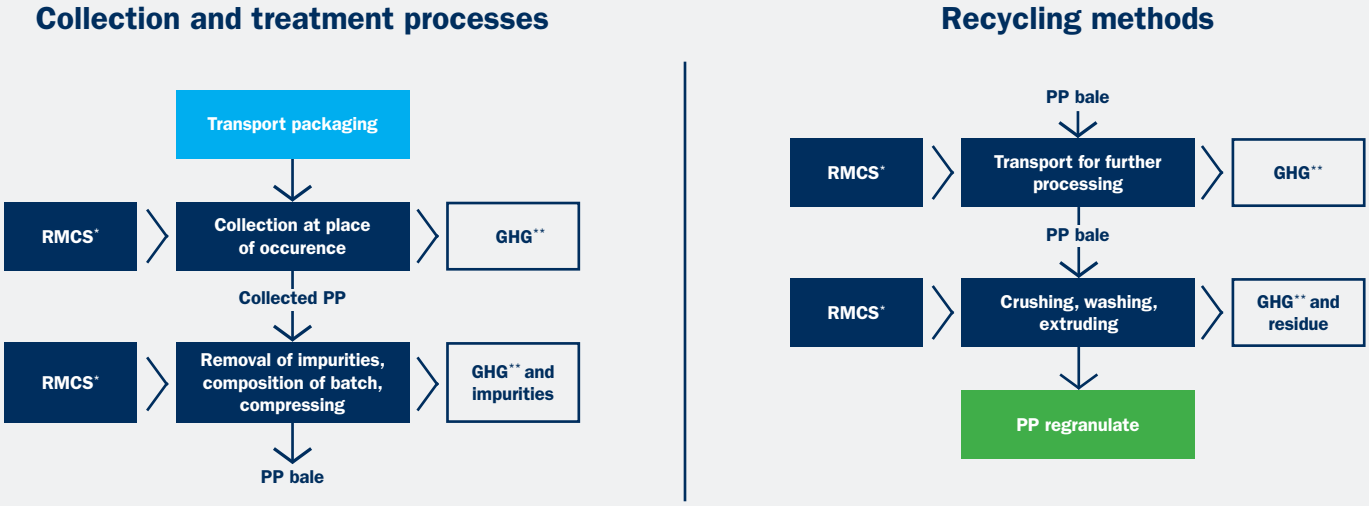
While academic research and day-to-day practice are often thought to be worlds apart, the reverse is true at Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT. Knowledge transfer plays a key role at this research institute in Oberhausen, Germany. “Importantly, our study has been designed to work with real-world data – which means figures that represent the actual fuel and energy consumed in treatment and production processes,” comments Dr Markus Hiebel, Head of the Sustainability and Resources Management Department at the Fraunhofer Institute. Together with a team of 13 researchers drawn from a wide variety of disciplines, the industrial engineer and environmental systems expert applies a standardised procedure – known as a life-cycle analysis – to calculate the overall environmental benefits derived from ALBA Group’s recycling activities.

**Making recycling activities measurable**

“Our work was unique in its field when we launched this series of studies in 2007,” Hiebel comments. Previously, the ecological ‘baggage’ of a product or service had been calculated on the basis of generalised average values. Only a handful of analyses existed that were quantified as kilogramme values for a company’s individual material streams. Yet this was exactly what was needed to make ALBA Group recycling activities measurable and auditable. Accordingly, Hiebel and his team developed a novel methodology that compared the production of primary materials with that of recycled materials based on data collected from real-world practice. The central thrust of this methodology was that making products from primary resources such as crude oil creates environmental impacts that are also a result of manufacturing processes based on recycled materials. Comparing the two kinds of processes could therefore identify the potential savings from recycling. While early versions of the study analysed greenhouse gas emissions only for standard closed-loop materials such as steel, wood and paper, more complex material streams like waste electrical/electronic equipment and lightweight packaging were included in later years. In 2013, the scope of the study was again widened considerably and it now looks at overall resource consumption.


The core team for the life-cycle analysis report: life-cycle analysis expert Dr Daniel Maga, sustainability management expert and Head of the Sustainability and Resources Management Department Dr-Ing Markus Hiebel, chemical engineer Venkat Aryan and geoscientist Jochen Nühlen (from left to right)

# **Polypropylene (PP) recycling process** using transport packaging as an example




*RMCS: Raw materials, consumables and supplies, e.g. diesel or electricity
**GHG: Greenhouse gas emissions

**The first stage in a life-cycle analysis is an accurate visualisation of the recycling process – for the polypropylene (PP) material stream, for example. All steps are documented: from pick-up at the place where waste originates to sorting and processing, and then on to shredding and melting in the extruder to make the PP 'regranulate'.**

### A four-step calculation

While the idea is simple enough, the calculations are anything but, and require researchers to map out the primary process and the recycling process for each material stream in detail. Taking polypropylene (PP) as an example, all of the process steps involved in making the plastic – from oil extraction and transportation to the refinery to distillation and polymerisation – are surveyed and visualised in the system. The same approach is taken to the recycling process: starting from pick-up at the place where the waste generates to sorting and processing, and then on to shredding and melting in the extruder to make the PP 'regranulate'.

### Data collection and life-cycle analysis with GaBi

In a second step, the relevant data for each individual process are collected and fed into the GaBi life-cycle analysis system. 'GaBi' comes from the German term for integrated life-cycle analysis ('ganzheitliche Bilanzierung') and is a programme for calculating environmental impacts. Fraunhofer's interdisciplinary team can apply all of its technical expertise to obtain data describing the resource consumption, delivery channels and energy usage required to make a tonne of PP. To analyse the recycling process, the team uses the detailed sets of data about this process provided by the ALBA Group – from the quantities of material processed and kilowatt hours used by individual pieces of plant through to the delivery channels and fuel consumption recorded for the trucks or container vessels involved.

### Fine-tuning where it makes a difference

The third step involves the actual calculation of the environmental impact. Taking the data input, the software works out the exact amounts of raw materials involved and the greenhouse gas emissions created by the primary and recycling processes. The last step is to compare the two values: the material stream with the higher number is better in terms of the environment. "By applying our method, we show that recycling has a positive impact and is not merely an end in itself," concludes Hiebel. Reprocessing just one tonne of plastic waste into recycled PP material saves 619 kilogrammes of greenhouse gas emissions compared with the primary process. At the same time, the life-cycle analysis clearly highlights the point in the process chain where raw material or energy consumption is the highest, and where most emissions occur. While sorting has very little environmental impact, for example, most emissions are generated by transportation and during extrusion. This gives the ALBA Group important information about levers it can pull to fine-tune its recycling process even more.

And in the future, the researchers at Fraunhofer UMSICHT plan to go one step further. Markus Hiebel: "To fully exploit the potential offered by using raw materials, we need to take a much closer look at the design and production of 'recycling-friendly' products." This is where the intelligent use of materials could help companies secure access to high-quality recycled raw materials – and achieve another milestone on the way to a comprehensive circular economy.

# On the way to a **comprehensive circular economy**

Today, closed-loop resource management is undoubtedly one of the most important solution models for ensuring effective climate and resource protection. But how can we better utilise this potential in the future? What technologies and methods can help to improve the environmental benefits offered by recycling? This is where the ALBA Group is pioneering innovative ideas for the sustainable restructuring of the economy. By investing in innovative sorting systems, high-quality recyclates and digital services, the Group aims to help create the right conditions to fulfil higher rates of recycling and the basis for a smart circular economy of the future.

An important step to help materials entering the loop and making waste avoidance more efficient, is designing products that are easier to recycle. This is also an integral part of the new German Packaging Act: manufacturers should receive financial incentives to design their packaging to be easier to recycle and less resource-intensive.
Interseroh developed its 'Made for Recycling' service to provide support to companies wanting to optimise their packaging for sustainability. This scientifically sound methodology for assessing recyclability was created as a joint effort with the bifa environmental institute and has been approved by the Fraunhofer Institute for Process Engineering and Packaging IVV.

**An investment in recycling-friendly packaging**

The recycling experts at Interseroh use standardised lab processes to examine the packaging down to the very last detail. Can consumers easily tell whether the packaging should be disposed of in waste paper or the 'Yellow Bag'? What is the condition of the materials used? What kinds of impurities are present, and how well can the packaging be sorted by machine and mechanically recycled? In its own lab in Maribor in Slovenia, the company has set up its own near-infrared (NIR) scanner – a machine normally installed in sorting plants. NIR cameras scan items of packaging on the conveyor belts and can identify the various types in the blink of an eye. Once identified, a stream of air is then applied accurately to separate the various materials. In this way, Interseroh is able to test in Maribor whether and how often packaging is correctly identified when it is arranged in different positions on the conveyor belt. At the end of the laboratory tests, comparable results are available, as well as specific starting points for sustainable optimisation. Only packaging considered to have very good recyclability is allowed to display the 'Made for Recycling' quality seal. This ensures consumers are given reliable guidance and can make a conscious decision to choose recycling-friendly packaging when they go shopping.


"Made for Recycling" helps companies optimise the recyclability of their packaging


Interseroh and EREMA are winners of the 2019 Plastics Recycling Awards Europe

**Innovative technologies for high-quality recyclates**

Managing plastics in the loop continues to be a considerable challenge. Interseroh's Centre of Competence in Maribor has established an international reputation as a think tank for innovation in this field. The company's contributions here include not only the 'Recycled Resource' method but also the formulations for its recycled plastics. One example of its successful research and development work is the COREMA® cascade extrusion system.

## Investing in innovative sorting systems, high-quality recyclates and digital services.

With COREMA®, it is now possible to manufacture made-to-measure recycling compounds for high-quality applications in just one process step. This innovative technology, which in its combination has been developed especially for the requirements of Interseroh, also won a Plastics Recycling Award Europe in 2019. This 'one-extrusion' process makes it possible to add additives, modifying agents and inorganic fillers during the production process of the recycled plastics. Quality control is automated and carried out in real time. This means Interseroh can make customer-specific 'recompounds' to meet the challenges of high-quality applications. The process also cuts energy and resource consumption and saves – even when manufacturing complex formulations – more than 50 percent of greenhouse gas emissions, compared with the use of new granulate made from crude oil.

**Digital services: Lizenzero**

Intelligent recycling technologies and recycling-friendly starter products form only one part of the equation. It is equally important to ensure that companies who distribute packaging also honour their product responsibilities. The German Packaging Act requires these companies to report their volumes of packaging to a dual system and thereby ensure its professional waste management and recycling. To make this easier, especially for smaller companies with little experience in this area, Interseroh recently launched its online shop 'Lizenzero' (www.lizenzero.de). The shop enables customers to complete the licensing process in just a few clicks and ensure their packaging remains legally compliant. A small step for the companies who use it – yet another important step along the way to a comprehensive circular economy that protects our climate and resources.


Lizenzero is the easy digital solution for all companies subject to licensing requirements

# Part of the **solution**

Every year, Germany produces around 20 million tonnes of plastics. Over 30 percent of these plastics are ultimately destined for use by the packaging sector. While virtually indispensable for many kinds of products that need protecting, the sheer volume of plastic packaging now in use represents a serious ecological challenge. Avoiding unnecessary packaging is one approach here – but it is equally important to ensure that packaging is reused as a resource. Over the last few years, the ALBA Group has been setting standards to follow for managing plastics in the loop. In 2018 alone, the Group's closed-loop management of plastics saved more than 800,000 tonnes of greenhouse gas emissions and some 4.6 million tonnes of primary raw materials.

And it's a winning formula: as the quality of recyclates resulting from the recycling process improves, potential sales increase – and so do the benefits for climate and resource protection. With its broad range of initiatives and services – from developing recyclates equal in quality to new resources to technologically sophisticated recycling methods and packaging optimisation – the ALBA Group has been blazing the trail for a growing market. Importantly, all of the stakeholders in the packaging lifecycle must now coordinate their efforts to ensure that the packaging design phase accounts for recyclability as well as product protection and marketing needs. This view is also shared by Dr Siegfried Kreibe, Director of the bifa environmental institute, and Winfried Batzke, Director of the German Packaging Institute. In the following exchange, the two experts discuss ways of ensuring that the material loop for plastics is closed even more effectively.

**Winfried Batzke:** Plastic packaging is a highly dynamic market – and has been for some time now. When the German Packaging Ordinance came into force in 1991, the primary focus was on reducing material use. Since then, plastic packaging has become an average of 25 percent lighter. Today, we have ultra-thin, ultra-light composite plastics with unique barrier properties at our disposal, which considerably reduces the volume of food wastage while protecting valuable resources.

**Dr Siegfried Kreibe:** The degree of protection offered to the product is in fact the key criterion when evaluating packaging. In the life-cycle analysis, the protection offered during storage or transportation and the longer shelf-life for the packaged product actually ranks higher than recycling. The multi-layer composite films you refer to do indeed offer excellent product protection while keeping packaging weights very low – but they usually cannot be recycled. If we wanted to achieve the same protection with monolayer materials, we would need a far greater volume of packaging. This makes little sense from an ecological perspective. In most cases, however, product protection can be reconciled very well with a recycling-friendly packaging design.

**Winfried Batzke:** The German Packaging Act has taken the lead here by creating incentives to improve the recyclability of packaging materials. This has invigorated the market: ideas for 'closed-loop-ready' packaging are now being researched in many different ways. Actual solutions will take time, however, since production lines cannot simply be converted overnight.

Dr Siegfried Kreibe

Winfried Batzke


**Talking about packaging optimisation**
The ‘Future Resources’ symposium has the aim of promoting ideas for the comprehensive closed-loop management of packaging. This series of events was launched by Interseroh in cooperation with the German Packaging Institute. Experts from retail, manufacturing and the recycling industry get together to identify sustainable solutions to future packaging. The third Future Resources event, entitled ‘Designing packaging with value in mind’, will be held on 7 November in Frankfurt, Germany. Visit www.future-resources.de for more information.

**Dr Siegfried Kreibe:** I think the biggest challenge right now is the role of packaging in marketing. Studies show that retail purchasing decisions continue to be strongly influenced by the packaging’s visual impression on the consumer. So the question is: can high-gloss packaging or packaging with a lot of label real estate be designed in such a way that it can be identified – by an infrared detector in the sorting plant, for example – and properly handled for recycling? This is where product designers and developers need a new approach. Apart from meeting marketing needs, recycling options also need to be built in from the outset. The bifa environmental institute has worked with Interseroh to develop a scientifically sound assessment standard that helps manufacturers to optimise their packaging for sustainability and design it recycling-friendly.

**Winfried Batzke:** A majority of manufacturers and retailers have now adopted strategies that share a common vision: by 2025, all plastic packaging should be recyclable and at least 50 percent of this packaging should be made from recyclate. In my opinion, these ambitious goals can be achieved only by a closer collaboration between manufacturers, retailers, waste management companies and recycle producers.

**Dr Siegfried Kreibe:** I’d agree with that. To strengthen the sales market for recycled plastics, all of the stakeholders in the material lifecycle need to define a set of shared criteria and standards for quality assurance. This kind of coordinated approach also creates a positive consensus about using recyclates – even if some differ from new materials in terms of properties. Given their substantial buyer power, the public sector, local authorities, ministries and municipalities could also lead by example here, by including the use of recyclates – and recycled plastics in particular – in their procurement criteria. The success of waste paper recycling can be traced back to exactly this kind of ‘helping hand’ of public procurement.

**resources SAVED: Around 820,000 tonnes of greenhouse gas emissions were saved by the ALBA Group in 2018 by recycling more than 1.1 million tonnes of lightweight packaging* and plastics.**

**1,125,871 t**
**quantity recycled**

**PP 9,625 t (0.9 %)**
PE 109,874 t (9.8 %)
**PET 80,193 t (7.1 %)**
Mixed plastics 37,018 t (3.3 %)
**LWP ALBA 512,000 t (45.5 %)**
LWP Interseroh “Dual System”
377,161 t (33.5 %)

**818,714 t**
**greenhouse gas savings**

**PP 5,958 t (0.7 %)**
PE 70,539 t (8.6 %)
**PET 86,849 t (10.6 %)**
Mixed plastics 19,286 t (2.4 %)
**LWP ALBA 300,032 t (36.6 %)**
LWP Interseroh ”Dual System“
336,050 t (41.0 %)

*Calculations of resource savings are based solely on conventional collection using the German ‘Yellow Bin’/’Yellow Bag’ system.

# Naturally **recyclable**

Steel, aluminium and other metals retain their original properties even after being recycled multiple times. After reprocessing into recycled raw materials, metals can repeatedly be reused for the same application. In 2018, ALBA Group's closed-loop management of metals saved around 2.3 million tonnes of greenhouse gases and more than 16 million tonnes of primary raw materials.

It's a closed loop that works: almost half of the raw steel produced in Germany is now made out of steel scrap. The proportion of recycled raw materials used in the production of non-ferrous metals like aluminium, lead, copper, nickel and zinc is also around 50 percent. The use of one tonne of steel scrap compared with the primary material of iron ore saves one tonne of $CO_2$ emissions, while the savings for copper amount to over three tonnes. But aluminium tops them all: using one tonne of recycled aluminium reduces the ecological footprint by around ten tonnes of carbon dioxide. The re-melting of aluminium scrap consumes just five percent of the energy that is required to extract the same metal from bauxite.

**Closed-loop management of aluminium in the construction industry**

Starting in the mid-1990s, the metal construction industry has successively built up a closed material loop for aluminium scrap to guarantee its long-term security of supply. In terms of the importance of aluminium, construction is second only to the transport sector. Every year, over half a million tonnes of aluminium are used in construction projects in Germany – primarily for facades, doors, windows and roofing systems. A closed material loop aims to ensure that the high-quality aluminium alloys present in existing building stock do not get dumped into the general-purpose waste metal recycling system, downcycled or – worst of all – shipped out as exports.

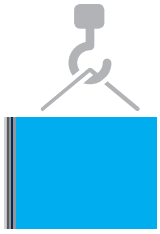
This product-related material loop is organised by the German Association for Aluminium and the Environment in Window and Facade Construction (A|U|F). The Association's 185 members – many of whom are metal construction firms, systems providers and interior design agencies – agree to collect offcuts and chippings from production as well as end-of-life components and sections taken from demolition and gutting work. This aluminium waste is collected, shredded, sorted into mono-fractions and pre-processed by environmental contractors like the ALBA Group before being re-melted in the aluminium foundry to cast new extrusion billets. Aluminium extrusion plants then process this recycled aluminium into new sections for use in window and facade construction.
Apart from the first-class quality of the recycling raw material, this steadily increases the proportion of recycled aluminium used to make new aluminium products. A model that is soon to be copied: industry association European Aluminium plans to roll out the German system across Europe.

Aluminium A|U|F Wertstoffkreislauf

**resources SAVED: Around 2.3 million tones of greenhouse gas emissions were saved by ALBA Group in 2018 by recycling more than 1.3 million tonnes of metals.**

**1,328,424 t**
**quantity recycled**

Aluminium 62,244 t (4.7 %)
Copper 13,728 t (1.0 %)
Steel 1,225,580 t (92.3 %)
Stainless steel 17,179 t (1.3 %)
Lead 3,603 t (0.3 %)
Zinc 2,060 t (0.2 %)
Brass 4,030 t (0.3 %)



**2,339,318 t**
**greenhouse gas savings**

Aluminium 486,748 t (20.8 %)
Copper 25,424 t (1.1 %)
Steel 1,744,000 t (74.6 %)
Stainless steel 64,078 t (2.7 %)
Lead 2,065 t (0.1 %)
Zinc 4,429 t (0.2 %)
Brass 12,574 t (0.5 %)

# **Phones and PCs** with potential

Avoiding waste, extending product lifecycles and closing loops requires an integrated approach to the handling of material streams. Efforts here are increasingly focusing on IT and communication equipment. In 2018, ALBA Group‘s recycling specialists saved around 62,000 tonnes of greenhouse gases and some 1.9 million tonnes of primary raw materials by managing waste electrical equipment in a closed loop.

The latest smartphone and a more powerful personal computer: IT and communication equipment is often replaced after only a couple of years of use. According to digital association Bitkom, only 12 percent of smartphone users in Germany keep their current device for longer than two years. In light of the deluge of new products and their short useful life, professional recycling is essential: the raw materials they contain – which include some valuable metals – should be recovered as completely as possible.

**Consistently sustainable**

Many devices discarded by consumers – whether smartphone or tablet, laptop or laser printer – are still fully functional and could be given a second life. This is why Interseroh has expanded its service portfolio to include IT refurbishment. Professional reconditioning sustainably extends the product life cycle. Interseroh organises all process steps in this context. The environmental services provider picks up old equipment from companies and government agencies all over Europe. The first item of business is then to erase all data stored on the devices. This is followed by a specialised audit where the IT experts examine each device. Most of these refurbished products are then sold again on the general market. Only truly defective equipment is sent for recycling in the ALBA Group. In 2018, Interseroh was able to extend the useful life of more than 100,000 devices.

**A helping hand for the environment**

This two-pronged strategy – reuse as far as possible, then recycle – means exploiting the full potential of each device in the best interest of the environment. According to calculations from the Fraunhofer Institute UMSICHT, refurbishing a smartphone rather than making a new one saves 14 kilogrammes of primary raw materials and 58 kilogrammes of greenhouse gas emissions. For tablets, this figure is as high as 139 kilogrammes per used device.

Secure erasure of data in cooperation with leading software provider Blancco

**resources SAVED: Around 2.3 million tones of greenhouse gas emissions were saved by the ALBA Group in 2018 by recycling more than 1.3 million tonnes of waste electrical equipment.**

**76,429 t**
**quantity recycled**

Large electrical appliances 13,918 t (18.2 %)
Refrigeration equipment 13,480 t (17.6 %)
Display screens 4,587 t (6.0 %)
LCD monitors 695 t (0.9 %)
Small electrical appliances 43,749 t (57.2 %)

**61,831 t**
**greenhouse gas savings**

Large electrical appliances 15,588 t (25.2 %)
Refrigeration equipment 13,615 t (22.0 %)
Display screens 1,206 t (2.0 %)
LCD monitors 360 t (0.6 %)
Small electrical appliances 31,062 t (50.2 %)

# A **multi-level** transformation

The digitalisation of media and the online shopping boom are reshaping the paper, paperboard and cardboard (PPC) material stream, and creating a new environment for recycling. And recycling is changing as well. Using modern – and increasingly, automated – sorting technologies, the ALBA Group is mastering these challenges and producing a large and consistently high-quality stream of recycled raw materials for paper mills. A win-win situation for industry and the environment: in 2018 alone, the ALBA Group's closed-loop management of waste paper, paperboard and cardboard saved 700,000 tonnes of greenhouse gas emissions and 5.5 million tonnes of primary raw materials.

Waste paper is an essential resource. A market report from the German Federation for Secondary Raw Materials and Disposal (bvse) states that the German paper industry processed around 17 million tonnes of waste paper in 2018 – some 75 percent of its total production output of around 22.7 million tonnes. At the same time the proportion of graphic paper products fell once again, with paper mills reporting a drop of 5.2 percent in 2018. Paper for packaging and cardboard rose by 1.6 percent, however, and now makes up some 53 percent of overall production volumes. One direct result of the e-commerce boom is a higher volume of paperboard parcels and packages in domestic paper recycling bins – and ultimately at recycling companies. Unlike newspapers and magazines, which can be easily recycled many times after the 'deinking' process (the removal of printing inks from the paper), the fibre quality in paperboard and cardboard is lower, which makes them less suitable for recycling. How do sorting plants go about meeting this challenge? "We're working on increasing the yield from materials that are good candidates for recycling, to ensure we can continue to provide enough recycled raw materials in the required quality in the future," says Halil Eroglu, who manages the systems as Head of TAP at ALBA Süd GmbH & Co. KG. "This is an area where we're prioritising the use of automation and digital technologies."

**A job for near-infrared technology**

Every year, the PPC sorting plant at ALBA Süd in Waiblingen, Baden-Württemberg, processes more than 100,000 tonnes of municipal waste. The plant aims to sort out as much deinking material as possible. This sought-after waste paper resource is then sent off for removal of the printing ink and reuse in paper mills. "We aim to achieve a mono-fraction of at least 98 percent purity here," comments Eroglu. To meet these targets, the waste paper passes through an array of sorting machines. After a coarse screen has removed heavy cardboard, fine screens then separate out paper scraps and envelopes from the stream. During a third sorting stage, steel drums fitted with metal 'paper spikes' are then used to spear and efficiently sort out the remaining items of paperboard.


Keeping an eye on quality: near-infrared equipment identifies different materials based on the light they reflect

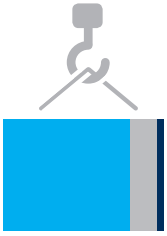
In mid-2018, ALBA Süd also installed three near-infrared devices (NIR scanners) to further improve the quality of its sorting. These scanners again check each item individually in the pre-sorted waste paper stream a second time. The scanners then use the spectral properties of the light reflected back to identify the materials contained in the packaging on the conveyor belt. Compressed air jets remove unwanted materials from the belt quickly and precisely.

**A continuously optimised cycle**

"The NIR scanners are very effective and reliable," explains Halil Eroglu. "However, some kinds of product packaging made from grey cardboard have brightly coloured coatings that make them look a lot like magazines – which is a problem even for our high-tech equipment." And when a piece of cardboard is rejected and blown off the belt by the compressed air jets, it can easily take a piece of a magazine with it that happens to be lying next to it on the belt. For this reason, only two of the three NIR systems in Waiblingen have been programmed to remove cardboard, grey cardboard and foils from the paper stream. Eroglu: "We then send this material stream along another conveyor belt through the third NIR scanner. This works in exactly the opposite way and returns any 'good' paper that's been sorted out by mistake back into the corresponding fraction." As a final step, one or more employees per stream perform a visual check and remove anything that the machines haven't been able to identify correctly.
For ALBA, the investment in the NIR scanners for the PPC sorting plant in Waiblingen was an important step towards ensuring it can stay competitive and meet the future requirements of the market. Eroglu: "Quality has improved immensely and we have also boosted efficiency while further reducing the effort required to perform manual steps within the process." Automating the entire sorting process and maximising the yield from deinking waste – and with it the volume of waste recycled – are the ultimate targets, Eroglu says. "We continue to work on optimising the overall process and improving the individual systems to ensure that – literally – not so much as a scrap of paper is lost from this valuable waste stream and resource."

A steady sorting stream: around 130,000 tonnes of paper, paperboard and cardboard is processed each year by the ALBA Süd plant

**resources SAVED: Around 700,000 tonnes of greenhouse gas emissions were saved by the ALBA Group in 2018 by recycling more than 2 million tonnes of wood, paper/paperboard/cardboard and glass.**



**2,018,853 t**
**quantity recycled**

PPK 1,506,865 t (74.6 %)
Wood 173,338 t (8.6 %)
Glass 338,650 t (16.8 %)

**705,827 t**
**greenhouse gas savings**

PPK 541,432 t (76.7 %)
Wood 72,282 t (10.2 %)
Glass 92,113 t (13.1 %)

**Contact**

ALBA Group plc & Co. KG
Knesebeckstr. 56 – 58
10719 Berlin
Germany

INTERSEROH Dienstleistungs GmbH
Stollwerckstr. 9a
51149 Cologne
Germany

info@resources-saved.com
www.albagroup.de

Learn more about
resources conservation:
www.resources-saved.com

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