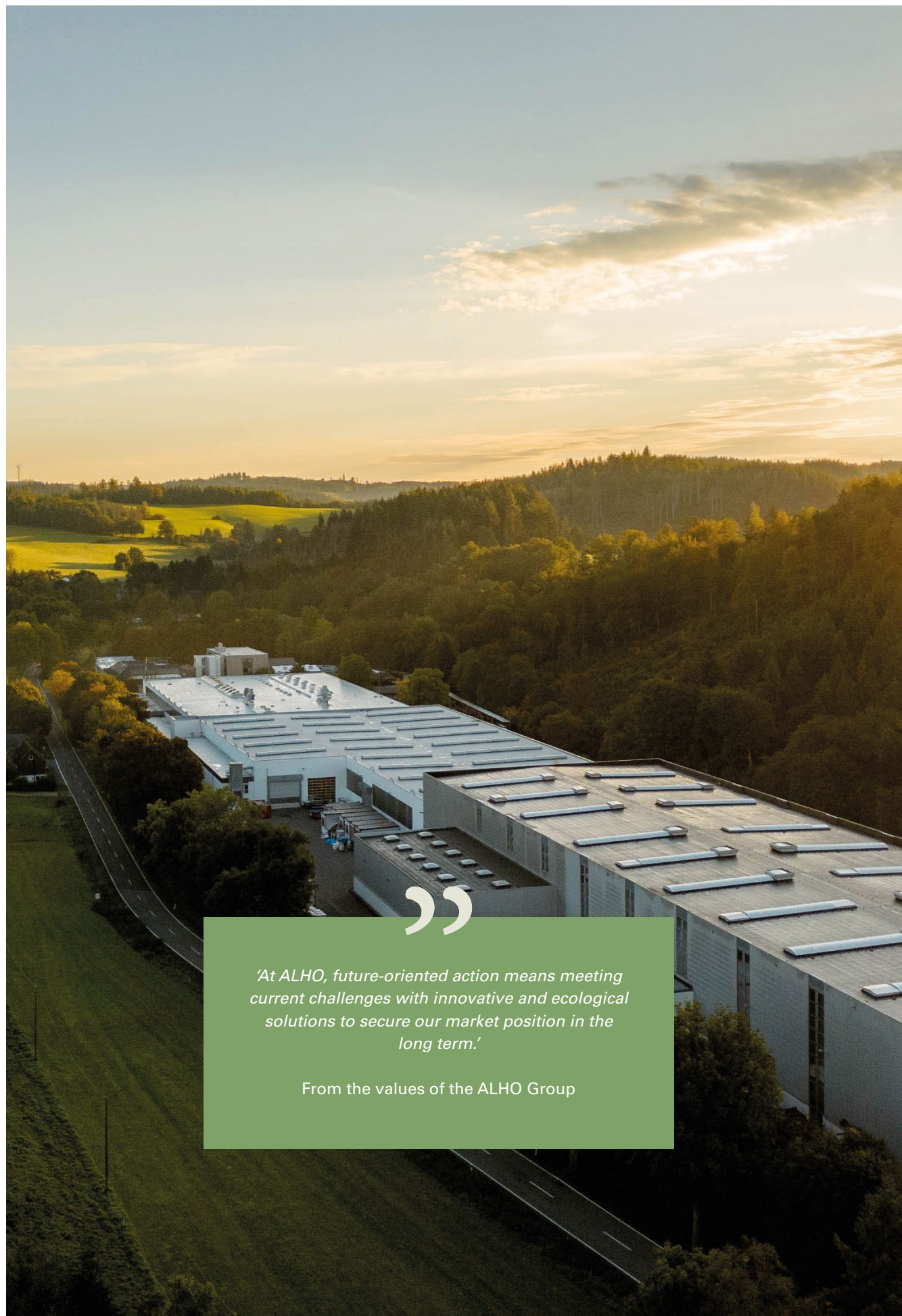


# MODULAR BUILDINGS



Building sustainably





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*'At ALHO, future-oriented action means meeting current challenges with innovative and ecological solutions to secure our market position in the long term.'*

From the values of the ALHO Group

## MORE SUSTAINABILITY IN CONSTRUCTION

# Taking responsibility for the environment

We are a family-owned company that has been existing for decades and still continues to grow. We consider sustainable action to be a fundamental part of our responsibility to society, to the regions around our company headquarters and around our subsidiaries throughout Germany, as well as to our locations in Benelux, France and Switzerland. We are constantly looking for innovative and ecological solutions.

In doing so, we consider our construction methods, our production processes and the conditions in our companies in equal measure. We are convinced that we are pioneers in sustainability within the construction industry. This is a major part of our success allowing us to look to the future with optimism.



Achim Holschbach, Silvia Matschke and Frank Holschbach, owner family of the ALHO Group.



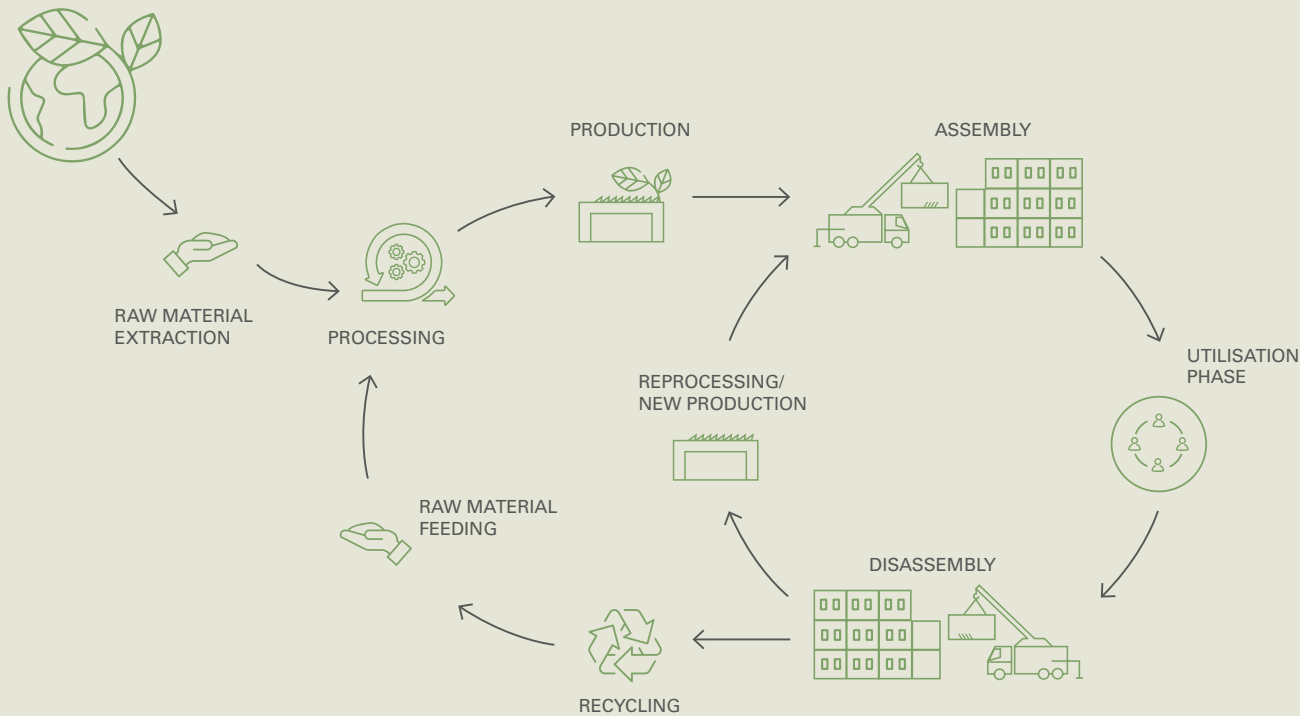
MODULAR CONSTRUCTION AS A PIONEER

Sustainable building means building in a circular manner

The resources of our planet will not be available forever if we continue to use them so intensively. The construction industry contributes greatly to the depletion of these resources. In order to achieve savings potential, available resources must be kept in circulation, i.e. reused as often as possible.



LIFE CYCLE OF AN ALHO MODULAR BUILDING



Modular buildings epitomise intelligent planning with regard to the material cycle and foresighted design. They offer maximum flexibility in use: extensions, additions, conversions, changes of use and recycling are possible at any time, thus ensuring that modular buildings can be utilised for many phases of use.



**40 %**  
Waste and CO<sub>2</sub> generated by the construction industry



**50 %**  
Share of grey energy in energy consumption over the lifecycle of a building





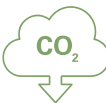
Even the production of modular buildings with conventional recycled steel enables a reduction in CO<sub>2</sub> emissions of around 20% compared to solid construction. If green steel is used, which is one of ALHO's stated goals, the CO<sub>2</sub> equivalents during the production of the building are reduced by around 30% compared to solid construction.

Furthermore, building with steel offers numerous design advantages over other construction methods that contribute to sustainability, such as the formation of a long-lasting load-bearing structure with slender cross-sections for maximum flexibility of use and optimal space efficiency.

**BUILDING WITH RECYCLED STEEL**

# The load-bearing force for sustainable buildings

Steel is the most recycled material in the world and is therefore highly compatible with a circular economy in construction. For example, 99% of structural steel remains in the material cycle, 88% of which is melted down and processed into new steel without any loss of quality. In Germany alone, steel recycling avoids more than 20 million tonnes of CO<sub>2</sub> per year. This is equivalent to the annual emissions of Berlin.

 **-20 million**  
tonnes of CO<sub>2</sub> / year

 **99 %**  
recycling rate  
of construction steel





## ALHO TIMBER HYBRID

# Wood + steel = sustainably ingenious!

In recent years, the concept of sustainability has led to a transformation in the construction industry. The use of renewable raw materials – especially wood – has become a major focus for builders, planners and project managers.

However, our current way of life means that even renewable building materials such as wood will not be available forever. The intensified demand for sustainable solutions in numerous industrial sectors and the increased occurrence of extreme weather events are currently causing a shortage of wood as a raw material. According to the WWF, despite its large forest areas, Germany is already unable to meet its per capita demand for wood with its own resources.



Our new ALHO timber-hybrid construction system was developed with a focus on resource-saving serial production in combination with the digitalisation and optimisation of the construction process. It is a modular construction method in which steel and wood are combined in a meaningful way, creating perfect synergies: we combine the sustainability aspects of wood as a building material with the technical and constructive advantages of steel.

The load-bearing steel frame construction is supplemented with ceilings and external walls made of wood. In our timber-hybrid construction, we use wood in the sense of conserving resources, precisely where it makes sense.



**70 %**  
Wood volume percentage



**30 %**  
Steel content





## INTEGRAL PLANNING

# Sustainably planned for our future

The basis for the sustainability of a building must be established as early as the planning phase. Modular construction involves integral planning. Unlike the conventional planning process, the structure and the building services are coordinated with each other so precisely. In addition to the construction and technical trades and specialist disciplines, all life cycles of the building, as well as costs, user comfort and ecology, are taken into account.



Our sustainability planning plays a key role in this. A network of experts from various fields addresses the sustainability issues that arise during the planning, construction and operation of buildings. For example, we have our own DGNB auditor available to our customers, who will support the certification process on request and work closely with the sales, property planning and project management teams.

With the services of our specialist planning, including sustainability planning, we consider the building holistically over its entire life cycle.





One aspect of this is the optimal use of materials. We receive many materials in optimised fixed dimensions, meaning that fewer residual materials are produced. Additionally, our further processing conserves resources. For example, our sawing centre calculates the arrangement of the required wall elements on drywall panels in to minimise waste during cutting.

The recycling of materials is another important aspect of resource conservation. ALHO has entered into cooperative agreements with several manufacturers such as those in the drywall construction and insulation sectors. Under these agreements, any material residues that may arise are returned, recycled and processed into new products.

Automation also plays a major role in the efficient industrial series production of room modules. A number of automation projects are currently in the planning or implementation phase. On the one hand, these serve to reduce the physical strain on employees, to make work more comfortable and ergonomically healthier, and thus more attractive for all employees. On the other hand, they are intended to increase output.

The high degree of prefabrication of the modules also forms the basis for low-emission construction sites. The environmental impact of dirt, noise and construction waste is significantly reduced. In figures, this means up to 20% less construction site traffic and a reduction of noise and construction dust by up to 50%. This makes modular construction ideal for adding storeys and for extensions or densification.

## (C)LEAN CONSTRUCTION

# Resource-efficient production and low-emission construction site

ALHO's modular construction method is based on the principle of lean construction. Through continuous process optimisation, all available resources such as materials, personnel and energy are efficiently utilised during the production process, and waste is reduced to a minimum.

 **-20 %**  
building-site traffic

 **50 %**  
reduction of emissions







## LIVING AND WORKING IN MODULAR BUILDINGS

### Energy-efficient and cosy

One pillar of sustainable buildings is their socio-cultural quality. This is about the acceptance and appreciation of a building by its users. Aspects such as healthy environment, quality of life and aesthetic design play a major role.

Thanks to integral planning, modular buildings are designed for optimal energy efficiency and a comfortable indoor climate – warm and inviting in winter and pleasantly cool in summer. They can be realised up to energy-plus standard. The integration of renewable energies – e.g. solar thermal energy, photovoltaics both on the roof and in the facade – and innovative technologies such as an ice storage heating system is easily possible.

The ecological aspect of modular construction can be emphasised with a green roof or facade. A green roof seals surfaces, creates biodiversity, habitat for insects and food sources for birds. In addition to CO<sub>2</sub>, the green roof and the facade greening store moisture and thus contribute to a pleasant indoor climate.



CONVERT, CHANGE, REUSE, RECYCLE

## One modular building – many lives

One of the key criteria of sustainability according to DGNB is the ability to give buildings the longest possible life-span, thereby reducing the amount of land required for new constructions. Modular buildings have a significant advantage: thanks to their self-supporting steel frame structure with non-load-bearing internal walls, they are highly flexible. They can be redesigned, enlarged, reduced in size, converted or even completely relocated.



Furthermore, modular buildings are the realisation of a building that has been intelligently planned and designed with foresight in terms of the material cycle. They align with the approach of the circular economy due to their unique feature: modular buildings are 'mobile properties'.

Our construction method makes it possible to dismantle buildings by breaking them down into their individual modules, which can then be transported to another location and reassembled there. The basic steel construction makes it possible for the buildings to be given a second life in this way – and many more.

If at some point the modular building is no longer needed, it can be completely dismantled and sorted into its recyclable materials. This means that about 90% of all materials can be recycled and returned to the material cycle.





## WE LIVE AND BREATHE SUSTAINABILITY

# Sustainability goals of the ALHO Group

The transition to a sustainable and just society is an enormous task. At first glance, it makes you think of environmental protection, CO<sub>2</sub> reduction or waste avoidance. However, there are many more topics involved: diversity, openness and the added value of our economic activity.

We support the UN's standards for sustainable development. All our actions and decisions are based on the three pillars of ecology, economy and social responsibility. These three dimensions of sustainability can be found along the entire supply chain and include aspects such as the conservation of resources, recycling and energy efficiency.

An interdisciplinary team with members from all areas of the company is dedicated to the task of sustainably shaping everyday work in the ALHO group with ideas, projects and actions or everyday decisions.



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**MODULAR BUILDINGS**