



**Designing the Future Responsibly.**

**robatherm Sustainability Report 2023.**

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**Did you know?**

A leaf resembles a painting and also has fascinating properties. During its life, a tall beech tree, for example, stores around one ton of CO<sub>2</sub>.

By comparison: One human alone produces about nine tons of CO<sub>2</sub> annually.

# 1. Sustainability at robatherm





## 1.1 Foreword

Sustainability means thinking about future generations in one's actions. With this in mind, we make responsible decisions in our daily work. In 2023, robatherm looks back on more than 170 years of history. Our paramount goal is maintaining our independence as a medium-sized company, developing through its strength, and thinking about long-term generations. For us, that is a pivotal element of sustainable corporate leadership.

But this also means that companies are aware of their social responsibility - be it as employers, trainers, resource consumers, taxpayers, supporters and much more.

The requirements for clean air and energy efficiency are becoming ever more stringent to meet current and future challenges. robatherm, as "the air handling company", sees itself as having a responsibility to meet these requirements with efficient solutions and thus to support the achievement of climate protection targets within the building sector.

Sustainability is a complex issue. We've already done quite a bit at various levels, about which we provide information in this Sustainability Report. But far be it from us to rest on our laurels. On the contrary, it incentivizes us to continue developing into a Green Company.

We would be delighted if you would accompany us along this path.

**Mathieu Huber**  
**Philipp Baumeister**  
**Andreas Lamprecht**  
 Management robatherm



## 1.2 Strategic Focus

The United Nations (UN) has defined 17 Sustainable Development Goals (SDGs) to ensure sustainable economic, social, and ecological development.

However, this development is only possible if everyone contributes - politicians, companies, and private individuals. Therefore, in its sustainability strategy, robatherm consciously focuses on the SDGs to design the future transparently and responsibly.



### Materiality Analysis at robatherm

We are part of a consciously perceived environment: Due to international efforts to combat climate change, clean air, and energy efficiency requirements are becoming ever more stringent. robatherm seeks to play its part here and to anchor the topic of sustainability at all levels within the company.

Within the context of a materiality analysis, robatherm identified a selection of SDGs, which are to play a distinctive role in robatherm's sustainability strategy and upon which robatherm can exert particular influence.

During interviews with management and employees, the most significant impact opportunities for robatherm were identified by focusing on the following SDGs:

- SDG 3** 3 Good Health and Well-Being
- SDG 4** Quality Education
- SDG 5** Gender Equality
- SDG 8** Decent Work and Economic Growth
- SDG 9** Industry, Innovation and Infrastructure
- SDG 10** Reduced Inequalities
- SDG 11** Sustainable Cities and Communities
- SDG 12** Responsible Consumption and Production
- SDG 13** Climate Action



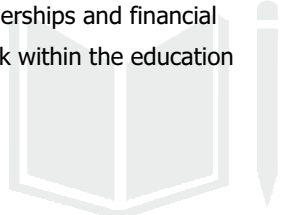
**SDG 3:**  
Ensure healthy lives and promote well-being for all at all ages.

Maintaining a healthy life and promoting well-being at any age is essential for sustainable development. Among other things, the United Nations cites reduced air pollution as a significant factor. As a manufacturer of air handling units, robatherm sees itself as responsible for contributing its solutions to ensure that people in buildings can breathe good air. As an employer, robatherm can also positively influence the health and well-being of its employees by providing excellent working conditions.



**SDG 4:**  
Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

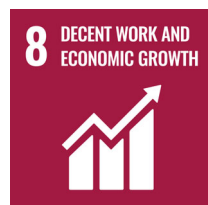
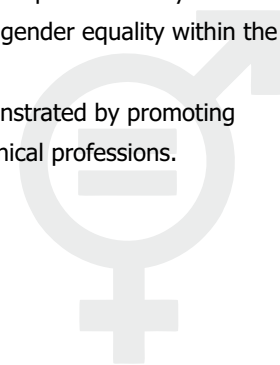
Dual vocational training is an essential pillar in Germany's education system. As a vocational training company, robatherm effectively provides young people with the opportunity of a high-quality apprenticeship. In addition, robatherm strives to support students, from various types of schools, during their career development process, as well as educational institutions with partnerships and financial assistance for their important work within the education system.





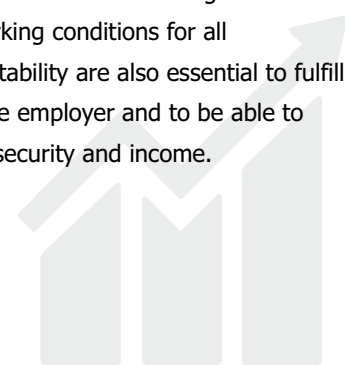
**SDG 5:**  
**Achieve gender equality and empower all women and girls.**

In the recent past, gender equality has made significant progress, yet much remains to be done to eliminate discrimination. robatherm's influence predominantly relates to the employer's role in ensuring gender equality within the robatherm company. In addition, this endeavor is demonstrated by promoting offers for girls and women in technical professions.



**SDG 8:**  
**Promote sustained, inclusive, sustainable economic growth, full and productive employment, and decent work for all.**

Decent work is fundamental for robatherm. Decent work is enshrined in the Code of Ethics and extends to our suppliers. As an employer, robatherm attaches great importance to excellent working conditions for all employees. Reliability and stability are also essential to fulfill its responsibility as a reliable employer and to be able to offer employees long-term security and income.



**SDG 11:**  
**Design cities and human settlements inclusive, safe, resilient and sustainable.**

Close to 60% of the world's population lives in cities. The sustainable design of urban living space is one of the great challenges of our time. As a manufacturer of air handling units, robatherm is committed to making its contribution to protecting people in buildings effectively from the polluted air, especially in cities, with the help of efficient and sustainable products and solutions.



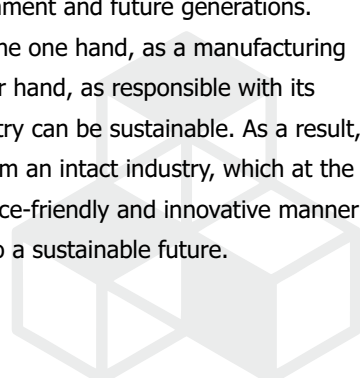
**SDG 12:**  
**Ensure sustainable consumption and production patterns.**

Sustainable consumption and production promote resource and energy efficiency, sustainable infrastructure, access to basic services, green and decent workplaces, and a better quality of life. With its air handling units, robatherm is working on solutions to more efficiently operate buildings for consumption, such as shopping centers and production buildings.



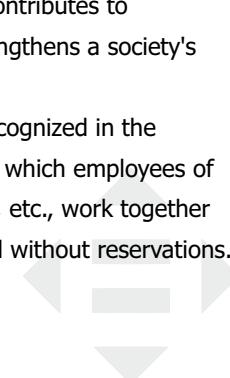
**SDG 9:**  
**Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.**

The industry is an important driver of economic development and employment. However, this must not be at the expense of the environment and future generations. robatherm sees itself, on the one hand, as a manufacturing company and, on the other hand, as responsible with its products so that the industry can be sustainable. As a result, the population benefits from an intact industry, which at the same time acts in a resource-friendly and innovative manner and safeguards the path to a sustainable future.



**SDG 10:**  
**Reduce inequality within and among countries.**

Growing social and economic inequality within states - but also between states - is one of the great challenges of our time. Promoting equal opportunities contributes to sustainable economic growth and strengthens a society's social solidarity. For robatherm, an influence can be recognized in the company's function as an employer, in which employees of different nationalities, religious beliefs, etc., work together and, above all, are treated equally and without reservations.



**SDG 13:**  
**Take urgent action to combat climate change and its impacts.**

Today, climate change is affecting every country on every continent. Even if new technologies are being pursued in various areas, solutions are already available to take countermeasures. Besides the fact that robatherm can contribute to a more resource-efficient operation of buildings with its products, robatherm is committed to setting a good example and acting responsibly at its sites.



**Forecast**

The report covers the fiscal years of 2021 and 2022. Further measures are in concrete planning or are already being implemented so that robatherm will continue to contribute to achieving the defined SDG Goals as part of its sustainability strategy.

For example, at the beginning of 2023 robatherm was successfully certified according to ISO 14001 (international environmental management standard). A new building at our site in Thailand is also intended to position robatherm's production in Thailand, with an eye to the future regarding sustainability and use of resources. The plans for this are already in full swing. In addition, robatherm is working on a new casing design with improved sealing.



## 1.3 Sustainability Report 2023

**This sustainability report's preparation underlines our ambition to become a "Green Company". The 2023 Report provides information about our sustainability strategy measures taken to date. We are aware of the fact that this is an ambitious goal and that this will be an ongoing process. Together with future sustainability reports, this will document our path into the future.**

### Reporting Period and Cycle

The Sustainability Report 2023 is robatherm's first report covering this topic in such detail and form.

The report covers the fiscal years of 2021 and 2022. Further reports will be published every two years to provide information on progress and new measures.

### Reporting per GRI Standards

Our reporting is based on the GRI Sustainability Reporting Standards of the Global Reporting Initiative and Sustainable Development Goals (SDGs) of the United Nations.

The report is prepared based on the GRI Standards.

That is why the report mentions the GRI data, to which reference is made at the relevant point.

An index at the end of the report refers to the pages on which we provide information on each GRI disclosure.

Other aspects are also considered, which, although not required by GRI, document robatherm's sustainability initiative.

### A Look at the Reporting Period

The reporting period of 2021 and 2022 is significantly influenced by the Corona pandemic and, since February 2022, also by impacts caused by the Russian war of aggression on Ukraine. These circumstances naturally made themselves apparent in robatherm's day-to-day business. It was evident in the increased difficulty procuring materials, last-minute postponements of customers' deadlines, and the daily work routine involving various hygiene measures. Despite the more challenging framework conditions, robatherm made it through the reporting period very well.

In 2022, Creditreform, one of the leading European rating agencies, named robatherm the most "crisis-proof" employer in Germany. Businesses independent of lending banks or other financial supports have different methods of responding to crises than credit-linked ones. This starting position also benefited robatherm during the reporting period. Therefore, planned measures associated with the sustainability strategy were implemented, despite changes in the underlying framework conditions.

### Contact Person

Several employees have contributed to the Sustainability Report.

Have you any questions concerning the Sustainability Report? Please feel free to contact the following person:

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**Head of Marketing**

**[robert.sauter@robatherm.com](mailto:robert.sauter@robatherm.com)**

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GRI 102-54

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## 1.4 Forecast



**This Sustainability Report relates to the fiscal years 2021 and 2022. Mathieu Huber, Chairman of the Management Board, provides insight into the future path of robatherm and explains why sustainability is fundamental to robatherm.**

***The Sustainability Report 2023 is robatherm's first sustainability report. How did this happen?***

**Mathieu Huber:** Lately, the word sustainability has been applied somewhat inflationary. Just publishing something so we can consider it done is furthest from our mind and doesn't correspond with robatherm's philosophy. I think it's a good thing that companies' sustainability is given a higher priority. As a family-owned and operated business that thinks in generations, I recognize sustainable corporate leadership within our company history, utterly independent of sustainability reports. So many things that seem self-evident are not. Then again, we don't want to rest on our laurels either. We want to keep moving forward and improving. The sustainability report is intended to provide transparency and document our path to becoming a green company.

***What are you hoping to achieve through this sustainability report?***

**Mathieu Huber:** No matter the topic, communication is crucial. We have also experienced this during discussions revolving around our new headquarters. The more we explained, for example, how the building technology was constructed and which sustainable technologies were used, the greater the understanding that we are serious about sustainability. That's why we want to ensure greater transparency on the one hand and, on the other hand, offer food for thought with this report.

Where can we improve? Where do our partners see the potential for improvement? Where do we perhaps have solutions that interest our business partners?

I am already looking forward to these conversations.

***robatherm on the way to becoming a "Green Company". What does the road ahead look like?***

**Mathieu Huber:** We know we still have room for improvement in many areas. But the will is there, and we're constantly working on improvements. Our following sustainability report is planned for 2025, and I am sure we will be able to report on several measures as part of our sustainability strategy.

***Do you have any specific examples?***

**Mathieu Huber:** I can reveal that we have now been certified in accordance with the international environmental management standard ISO 14001. EcoVadis will also evaluate us. In Thailand, we are planning to build a new production site.

By doing so, we also want to be positioned there for the future and make a statement regarding sustainable and resource-saving production. At our production sites in Germany, we also closely examine where we could further optimize, for example, by investing in a new paint booth and much more.

And as a company offering solutions in the field of building technology, we see it, in any case, as our responsibility to develop solutions that further improve sustainability in the construction industry.

***What development were you thinking of?***

**Mathieu Huber:** At ISH 2023, we presented a new type of casing design that is particularly leak-proof. Improved impermeability means less leakage and, thus, higher efficiency. But also, in the area of controls, we're making significant progress, particularly concerning our cloud solution. So, on the one hand, the challenge is to provide AHU solutions capable of operating efficiently. But on the other hand, we also want to offer solutions in the field of control, making it easier for our customers to operate their air handling units efficiently, even in practice, and conserving resources.



**Did you know?**

Some Bamboo species can grow up to one meter a day. Even though bamboo is grass and not a tree, bamboo is currently traded as an interesting alternative to wood.

As is so often the case, there is neither black nor white. Bamboo binds a tremendous amount of CO<sub>2</sub> and grows quickly. On the other hand, a significant part of the world's bamboo is currently produced in China, meaning the long transport distances significantly worsen the climate balance.

## 2. robathern - The Company





## 2.1 robatherm at a Glance

### 2.1.1 Organization Structure

The robatherm Group KG is a limited partnership of which Albert Baumeister is the liable partner. The organization's headquarters are based in Jettingen-Scheppach, Germany. The subsidiaries include robatherm GmbH + Co. KG, robatherm SARL, robatherm Co. Ltd, robatherm DMCC, and Alpha Coils GmbH. The robatherm Group KG holds 100 % of the shares in its subsidiaries, the only exception being the joint venture Alpha Coils GmbH with a shareholding of 50 %.

The workforce of robatherm totals 589 (as of 31.12.2022). Sales for the fiscal year of 2022 amounted to 150 million euros. These are mainly generated in Europe and Asia, although projects are also being realized on other continents, including South America. Air handling units are produced at three production sites; two in Germany and one in Thailand. In addition, robatherm GmbH + Co. KG maintains a representative office in Beijing, China, and Hanoi, Vietnam.

Furthermore, as a commercial agent for the French sales territory, robatherm SARL operates a sales office in Obernai, France.

robatherm DMCC operates a sales office in Dubai, United Arab Emirates, as part of its capacity as a commercial agent for the Middle East region. Target countries within the region include Bahrain, Kuwait, Oman, Qatar, Pakistan, and the United Arab Emirates.

### 2.1.2 Company Activity

robatherm is generally classified as a mechanical and plant engineering company and, in a more narrow sense, as part of the air conditioning and ventilation technology sector. robatherm manufactures air handling units (AHU). These AHUs are designed to provide air of defined quality in terms of temperature, humidity, purity, and circulation. Customized AHUs with the highest quality, safety, and sustainability standards for our customers' benefit express our consistent premium strategy.

The individual design of the AHUs and adaptation to the requirements of the respective building project characterize robatherm's business model. Individual product solutions and standardized work processes are not a contradiction in terms - quite the contrary.

Automated production workflows combined with our specialists' expertise and defined processes enable us to produce AHUs of consistently high quality. These are used, for example, within production and administration buildings, shopping centers, clean rooms, and medical facilities such as hospitals.

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GRI 102-5

GRI 102-6

GRI 102-7

GRI 102-8

GRI 201-1

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## 2.2 Ethics and Leadership



### 2.2.1 Management Structure

Sustainability is a cornerstone of our company philosophy. Therefore, robatherm's highest priority is to ensure the sustainability strategy is reflected within the holding company robatherm Group KG and its subsidiaries, including their management teams. For better transparency, the management structure of the executive board is documented.

#### robatherm Group KG

Albert Baumeister  
Personally Liable Partner  
Philipp Baumeister  
Managing Partner

#### robatherm GmbH + Co.KG

Mathieu Huber  
Chairman of the Management Board  
Andreas Lamprecht  
Managing Director

#### robatherm Co., Ltd.

Philipp Baumeister  
Director  
Mathieu Huber  
Director  
Winyoo Saisanit  
Director

#### robatherm s.a.r.l.

Mathieu Huber  
Managing Director  
Philipp Baumeister  
Managing Director

#### robatherm DMCC

Philipp Baumeister  
Managing Director

#### Alpha Coils GmbH

Philipp Baumeister  
Managing Director  
Mara Bertolo  
Managing Director

### 2.2.2 Code of Ethics

robatherm is one of the leading manufacturers of air handling units. In addition to high demands on the quality of our products and services, our actions are based on an appreciation for each individual. As a family business, we value mutual trust and respect and believe it is the cornerstone for ethical and sustainable business conduct. We also expect this from our business partners. Our Code of Ethics incorporates these values, is an integral part of our corporate culture and environmental policy, and is reflected in our mission statement. The Code of Ethics, as published in 2023, explicitly addresses this issue and puts our anchored values and beliefs on paper.

- Our Mission Statement
- Business Integrity
- Leading by Example
- Social Responsibility and Community
- Occupational Safety and Health
- Environment and Sustainability
- Data Protection and Confidentiality
- Supply Chain
- Implementation of the Code of Ethics

Not only can compliance violations have serious consequences for an individual, but for robatherm as well. In other words, if you suspect misconduct, you can approach any supervisor or member of management of your choice, with no need for an appointment, without adhering to reporting channel.

Suppose you are under the impression that you cannot voice your concerns there openly. In that case, we offer you the opportunity to use our Whistleblower System.

Violations are thoroughly investigated and are subject to sanctions. Grave violations by business partners contractually committed to this Code of Ethics are considered a material breach of the respective contracts.

This breach entitles us to withdraw or terminate these contracts without notice.

### 2.2.3 Corporate Mission Statement SHARE

robatherm stands for technology, sustainability and reliability. With an air handling unit, we are driven to provide our customers with an evolving premium package. We also hold ourselves to this same high-quality standard. The SHARE Corporate Values statement documents values and principles we all share at robatherm, and which guide our actions.

The SHARE Corporate Values Statement was officially launched in October 2022.

SHARE stands for the five topics that the company's mission statement focuses on:

- Sustainability (Nachhaltigkeit)
- Human (Menschlichkeit)
- Authenticity (Authentizität)
- Reliance (Vertrauen)
- Environment (Umwelt)

In the lead-up to the launch, employees were interviewed and surveyed on topics covered in the mission statement. Management's most important concern is to ensure that this values statement is put into practice and meets with a high level of acceptance. For this reason, the interviews were essential to understand the staff's perspective better, identify priorities, and demonstrate to other colleagues how issues are interpreted and understood.

After the launch, some of the first measures were a company-wide employee survey in 2022 and guided tours for interested employees to understand other areas of the company better. Further measures are already being planned to anchor the SHARE statement further and make it more dynamic.





## 2.3 Stakeholders

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GRI 102-7

GRI 102-8

GRI 102-13

### Dialog with Key Stakeholders

An open culture of dialog is essential to robatherm in communication within the company. We also want to apply this philosophy to our dialog with stakeholders outside the company. These stakeholders include individuals, companies, and organizations that share a relationship with robatherm. In addition to employees as internal stakeholders, other examples of external stakeholders include specialist planners, plant engineers, end customers, suppliers, and sales partners.

### Memberships and Association Activities

Another aspect of the willingness to engage in dialog is demonstrated by active participation in associations and committees. Sharing experiences and expertise is elementary to promoting the development of industries. robatherm is also active in various associations, such as EUROVENT, EUROVENT Middle East, the RLT manufacturers' association, the Swabian Chamber of Industry and Commerce, the Building Climate Association, the Association of German Engineers (VDI), bayme, and the Association for the Promotion of the Compatibility of Family and Career in the Günzburg District.

### Feedback Culture

All employees represent the robatherm brand. We attach great importance to direct communication, ensuring that feedback received by our employees from stakeholders is also heard within the company. Internal feedback meetings were conceptually redesigned to encourage employees to give feedback. Likewise, as part of introducing the mission statement, suggestions for improvement were explicitly requested, and a comprehensive survey of all employees was carried out. The Intranet was also relaunched for internal communication to enable faster news communication. Furthermore, we use social media channels such as Facebook and Instagram for product communication and reporting about the robatherm company. Again, we value dialog, respond to comments and messages, and provide information concerning questions about robatherm. robatherm is a globally active company without losing sight of our roots. That's why direct local dialog within the vicinity of our sites is a particular concern of ours. Therefore, we regularly exchange with representatives of communities, educational institutions, associations, and other interest groups. The aim is for our entrepreneurial approach to meet with broad acceptance within society.

### Sustainability in Communication

In dialog with various stakeholder groups, we have found that sustainability has been neglected in our communications. For this reason, we will increasingly report on measures taken within our sustainability strategy to become more transparent, especially in this area, and to communicate our beliefs and values more clearly. Detailed reporting on our headquarters' building technology, the preparation of our first sustainability report, and discussions with journalists and representatives from the world of politics are the first steps on the road to greater transparency in communication.



**Did you know?**

More than half of the earth's surface is constantly covered with clouds. Clouds can be both swift and very heavy. Winds can be much more robust in the higher troposphere than in the lower. This is where the so-called jet stream has wind speeds of up to 400 km/h, which is why the clouds in this region move so quickly. Their weight, on the other hand, is difficult to determine. Fair weather clouds are easier to delineate and, thus, easier to calculate. Even those clouds can weigh as much as 1,000 tons. Thunderclouds, however, are significantly heavier, and weighing several million tons is entirely possible.

### 3. Air Handling Technology made by robatherm





**Building technology plays a prominent role in using existing resources responsibly and sparingly. As "the air handling company", robatherm supports climate protection targets within the building sector by supplying highly efficient air handling units.**

We are aware of our responsibility and attach great importance to the fact that further developments in our product portfolio will always mean improvements in efficiency and sustainability. Even though efficiency has been a topic of discussion for years in the building sector and, thus, also in air handling technology, there is still ample potential here. In a comprehensive analysis lasting several months, robatherm examined the complete life cycle of an air handling unit.

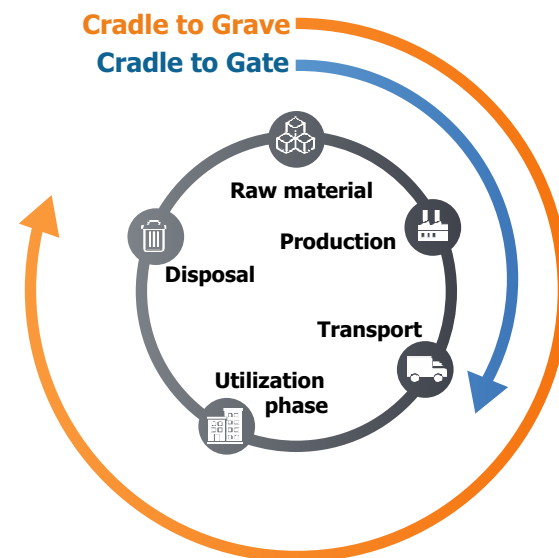
What might initially sound trivial is all the more complex when the components and their ecological footprint are also considered. Nevertheless, the results confirm that robatherm is on the right track. They also demonstrate the role played by digitalization and the efficient operation of air handling units.



# 3.1 Life Cycle Assessment of an AHU



Within the context of scientific analysis, robatherm examined the entire life cycle of an air handling unit. The life cycle of an air handling unit was also a focus at robatherm in the past - the TrueBlue Efficiency Certificate from robatherm proves this. In this case, the focus was primarily on the air handling unit's energy consumption over its life cycle. This study focused on the entire ecological footprint, including the installed components—an unparalleled analysis of our industry in complexity and comprehensiveness.



In the recent past, efficiency has been one of the predominant themes in building technology. Despite this, the question arises as to whether or not it will be sufficient in the future to consider only the efficiency of trades during the utilization phase and to neglect the entire life cycle assessment of the respective trade or product. These aspects are mostly ignored due to the complexity of calculating this comprehensively, as is made clear by the following illustration, which shows a simplified life cycle representation. Thus, the complete cycle includes the raw material, purchased parts, production, delivery, utilization phase, and disposal with the reintegration of materials into the cycle.

## Complexity as a Challenge

The big challenge is to analyze purchased parts, which also consist of components and raw materials. Essentially this includes the raw materials used in the corresponding quantities and the energy levels required for production, particularly as, in some cases, the quality and availability of data from suppliers varied greatly.

**27** Models were defined.

**79** Products and interim products were identified and analyzed.

**102** Processes were identified and analyzed.

In this study, 27 models, 79 products and interim products, and 102 processes were identified, prepared, and analyzed. robatherm is aware that the level of detail can be further refined to quantify the results more accurately. At the same time, the current study offers the opportunity to obtain a life cycle assessment of an AHU with reliable figures for the first time and to draw up recommendations for action on this basis.

## TrueBlue as a Crucial Foundation

The "TrueBlue" efficiency certificate from robatherm was an important step towards greater transparency in air handling technology. With this efficiency certificate, costs and characteristic values are presented transparently and assessable, allowing purchasing decisions to be made according to specific economic and ecological aspects.

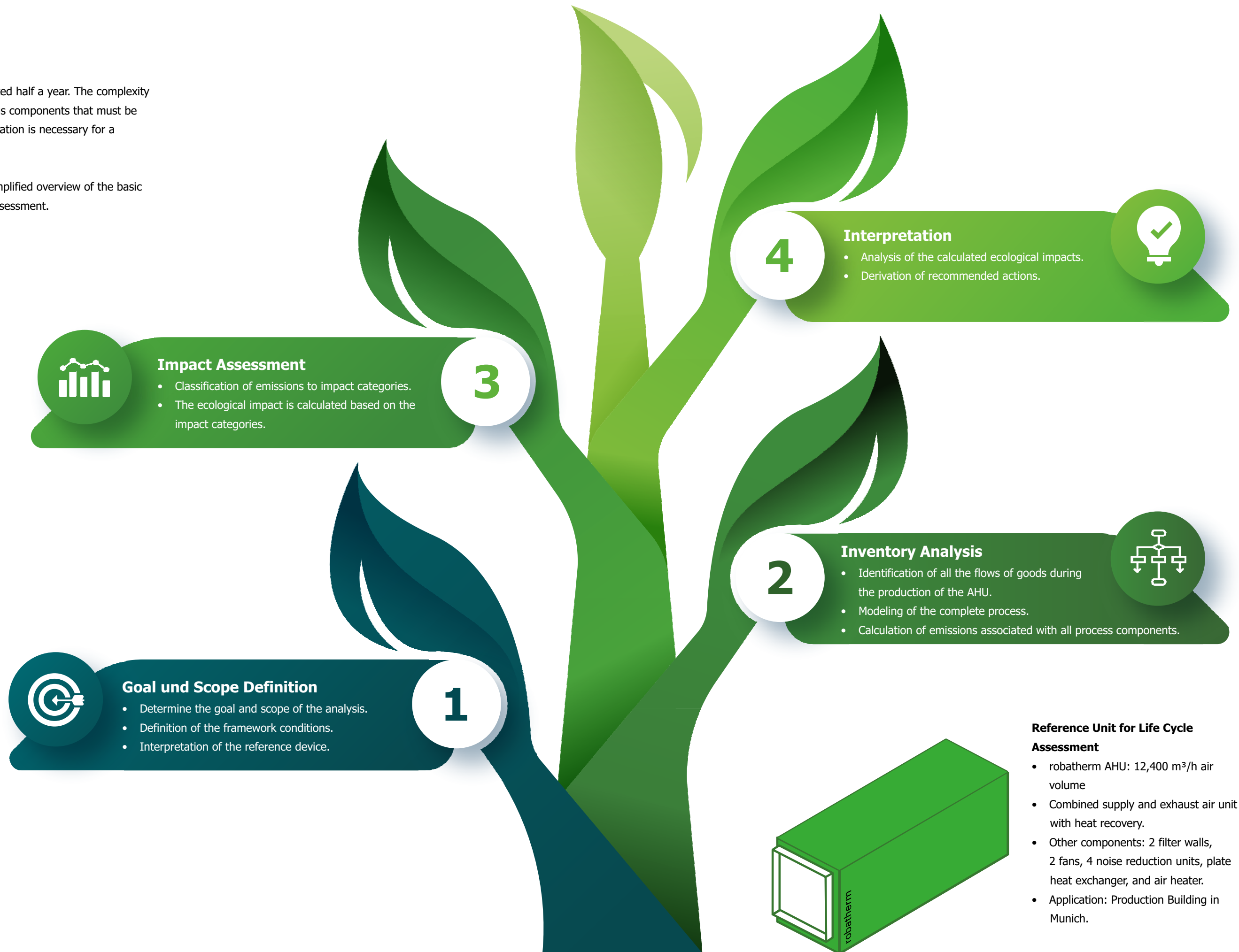
This transparency is essential for making decisions for an air handling unit concept, not only depending on investment costs. With the TrueBlue Efficiency Certificate, all costs are ascertained, which are decisive for investors and operators. The shift toward greater ecological awareness is also gaining ground in the real estate industry.

Efficiency certification involves determining the energetic and the economic optimum in equal measure. Investment, operating, maintenance, and disposal costs are disclosed depending on the specific application. For the calculation, we consider the plant's operating time and the weather data of the actual location. Only in this way can the system evaluation deliver substantial results. As a result, we enable our customers to make informed decisions - from an economic and ecological perspective.



In total, the investigation lasted half a year. The complexity is mainly due to the numerous components that must be analyzed and whose consideration is necessary for a comprehensive analysis.

The illustration provides a simplified overview of the basic procedure of this life cycle assessment.







### The Procedure of the Life Cycle Assessment (LCA)

The analysis is based on a specific reference unit, defined at the beginning based on typical requirements for robatherm AHUs. Based on this, all flows of goods were recorded, processes mapped, and the associated emissions calculated. The emissions were then classified into impact categories, the resulting consequences quantified, and the results interpreted.

### Framework Conditions of the Examined AHU:

A weatherproof air handling unit for the air conditioning in a production building in Munich. The objective was to supply the building with air-conditioning for 20 years while complying with all AHU and hygienic standards.

### Internal Data Collection

The structure, such as the frames, unit base, or base pans, and the casing surface, such as thermal panels, inspection doors, and roof panels, were examined in a partial analysis. Finally, the quantities of materials contained therein were calculated.

### External Data Collection

The examination of components sourced from suppliers was considerably more complex. It involved using information from suppliers on the one hand and, on the other hand, disassembling components and examining them for their materials.

### Process Analysis

Life Cycle Assessment comprises the complete life cycle, i.e., a so-called "cradle to grave" approach. This approach means manufacturing, transport, utilization, and disposal have also been considered for the AHU and each assembly and component.

### Impact Categories

The materials analyzed, and the associated emissions are grouped into impact categories based on their environmental impact. For example, the impact category climate change is described with the climate change and global warming potential (GWP) and measured in carbon dioxide equivalents, or CO<sub>2</sub>-eq. The CO<sub>2</sub> is, therefore, also called the reference substance. Other emissions contributing to the GWP are converted into CO<sub>2</sub> equivalents via a so-called characterization factor and added together.

### Example:

1kg CO<sub>2</sub> = 1kg CO<sub>2</sub>-equivalent

1kg methane (CH<sub>4</sub>) = 25kg CO<sub>2</sub>-equivalent

1kg nitrogen oxide (N<sub>2</sub>O) = 298kg CO<sub>2</sub>-equivalent

In addition, there are other impact categories, such as ozone depletion, land usage, shortage of fossil resources, and ecotoxicity. Finally, equivalents are calculated in the Life Cycle Assessment, and their impacts are summarized in the respective categories.

### The impact can be quantified as follows:

- Environmental Cost Indicator
- Greenhouse Potential
- Depletion Potential of the Stratospheric Ozone Layer
- Acidification Potential of Land and Water
- Formation Potential of Tropospheric Ozone Photochemical Oxidants
- Abiotic Depletion Potential for Non-Fossil Resources
- Human Toxicity Potential
- Freshwater Aquatic Ecotoxicity Potential.
- Terrestrial Ecotoxicity Potential
- etc.

### AHU Efficiency Measurement

In calculating the total equivalents, robatherm differentiated between the respective production phases, transport, utilization, and disposal, to better assess their influence on the categories. You can see the results of this examination on the following pages.



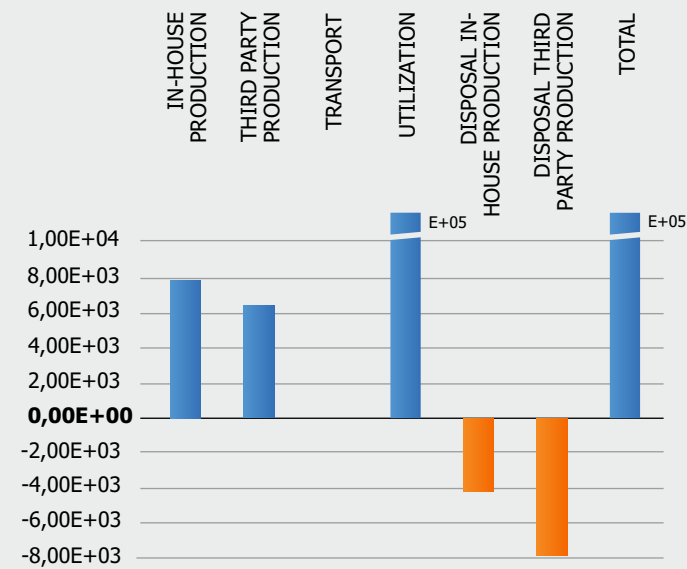
### CLIMATE CHANGE

Substances that increase the greenhouse effect, which, in turn, contribute to climate change. For this purpose, these substances are characterized by their absorption coefficients for infrared thermal radiation, their atmospheric retention period, anticipated immission development, and ranked compared to the CO2 effect.

Using the Global Temperature Change Potential (GTP) and the GWP is recommended. However, both potentials may be considered, concerning a time horizon of 20 and 100 years, which is why we speak of GWP20a / GWP100a and GTP20a / GTP100a, respectively.

#### Global Warming Potential

(GWP 100 years) [kg CO<sub>2</sub> eq.]

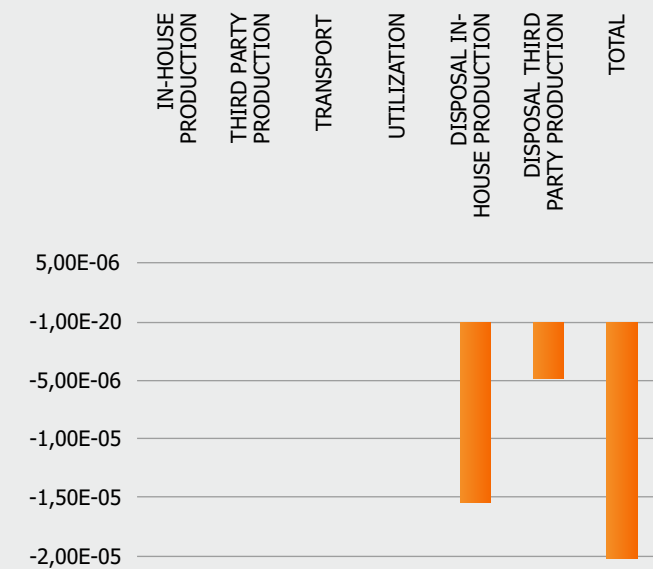


### OZONE LAYER DEPLETION

The catalytic effect of halogens such as fluorine and chlorine causes ozone layer depletion in the stratosphere under certain conditions. The ozone layer depletion potential is related to the substance group of fluorochlorohydrocarbons. The ozone layer essentially protects the earth's life from harmful ultraviolet radiation.

#### Ozone Layer Depletion Potential

(ODP, steady state) [kg R11 eq.]



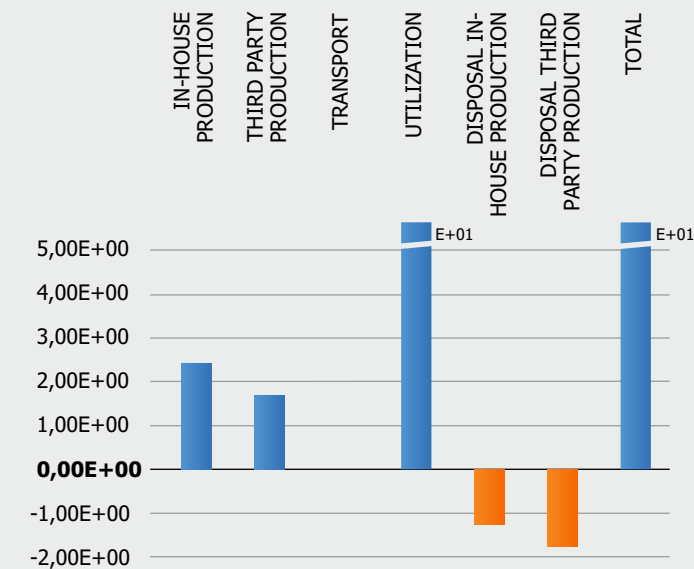
### PHOTOCHEMICAL OZONE FORMATION

The Ecosystem Ozone Formation Potentials (EOFP) characterize substances contributing to ozone formation in the troposphere. Unlike ozone in the higher stratosphere, ozone in the troposphere is detrimental to the climate. Together with CO2 and CH4, it contributes to the greenhouse effect.

Volatile non-methane hydrocarbons (NMVOC) or even NOx serve as reference substances, as they both make the same contribution to tropospheric ozone formation.

#### Photochem. Ozone Creation Potential

(POCP) [kg Ethene eq.]

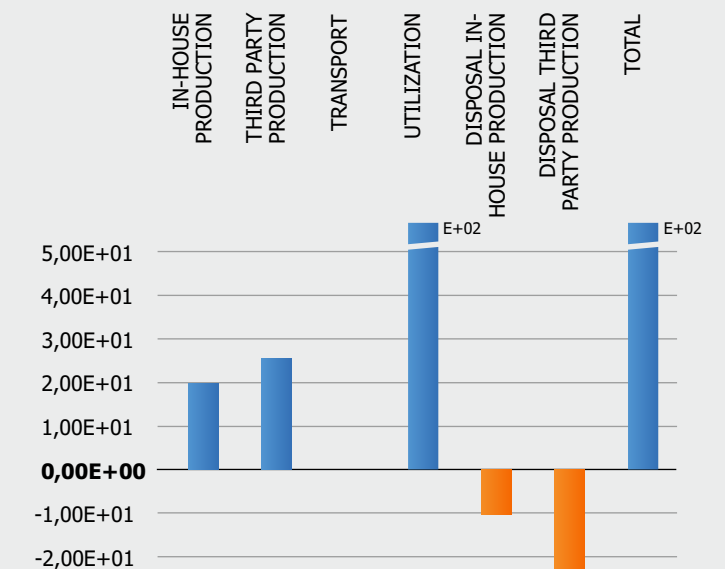


### ACIDIFICATION

The Ecosystem Ozone Formation Potentials (EOFP) characterize substances contributing to ozone formation in the troposphere. Unlike ozone in the higher stratosphere, ozone in the troposphere is detrimental to the climate. Together with CO2 and CH4, it contributes to the greenhouse effect. Volatile non-methane hydrocarbons (NMVOC) or even NOx serve as reference substances, as they both make the same contribution to tropospheric ozone formation.

#### Acidification Potential

(AP) [kg SO<sub>2</sub> eq.]



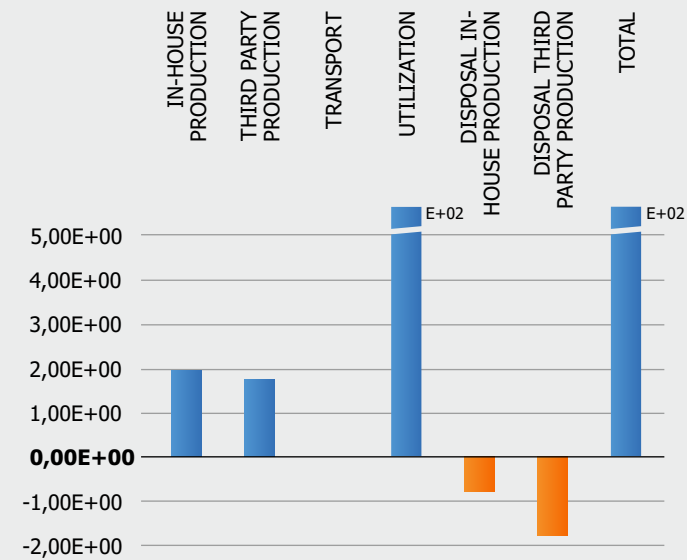


### OVER-FERTILIZATION OF AQUATIC ECOSYSTEMS

A distinction is drawn between saltwater and freshwater systems when it comes to over-fertilization or eutrophication of water bodies. While the eutrophication potential in oceans is characterized by nitrogen, phosphorus is used as a reference substance for freshwater lakes.

#### Eutrophication Potential

(EP) [kg Phosphate eq.]

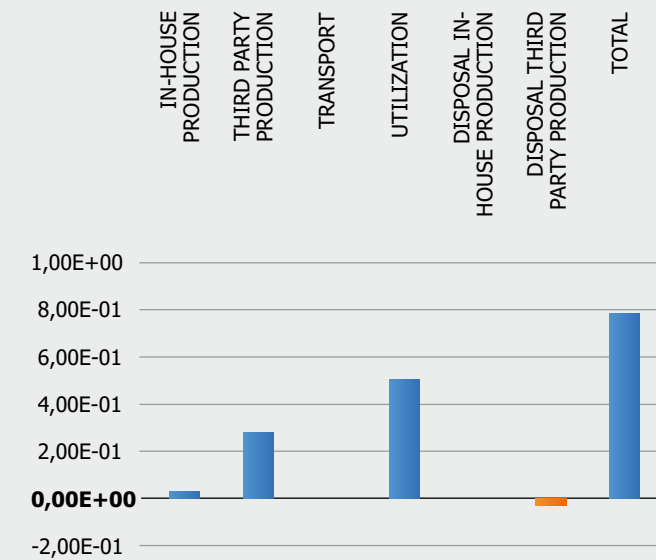


### MINERAL AND FOSSIL RESOURCE SCARCITY

There is ongoing disagreement in the literature about the impact assessment of resource scarcity. Different models rely upon cumulative energy demand, future incremental costs, or the criticality of resources. For example, one way to express mineral resource scarcity is to extract copper and oil equivalents to describe fossil resource scarcity.

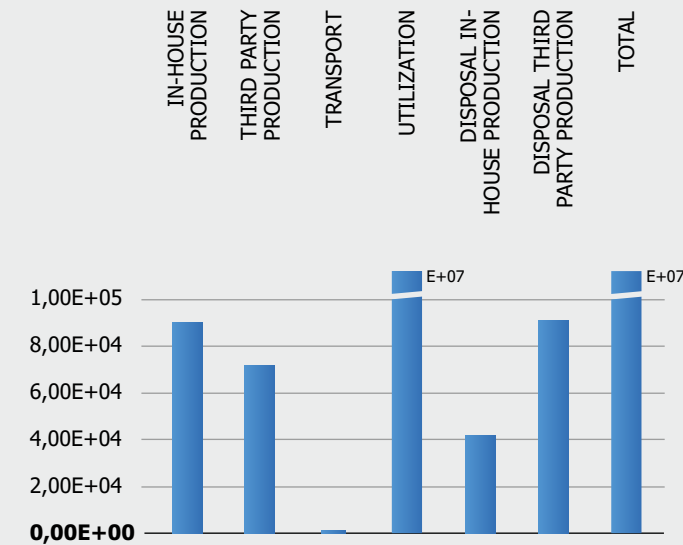
#### Abiotic Depletion

(ADP elements) [kg Sb eq.]



#### Abiotic Depletion

(ADP fossil) [MJ]

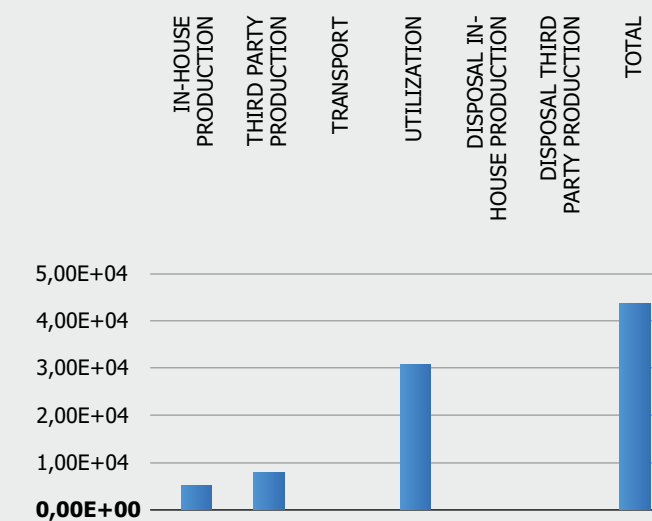


### HUMAN TOXICITY AND ECOTOXICITY

Both impact categories are described using the reference substance dichlorobenzene (1,4-DCB). Generally, toxicity potential to humans and the environment describes the release of toxic substances into the air, soil, and water, Increasing the risk of disease or the likelihood of premature death of humans, flora, and fauna.

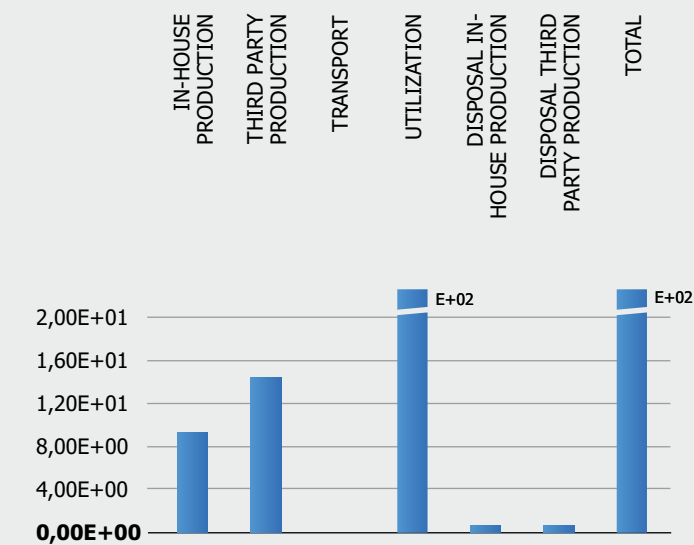
#### Human Toxicity Potential

(HTP inf.) [kg DCB eq.]



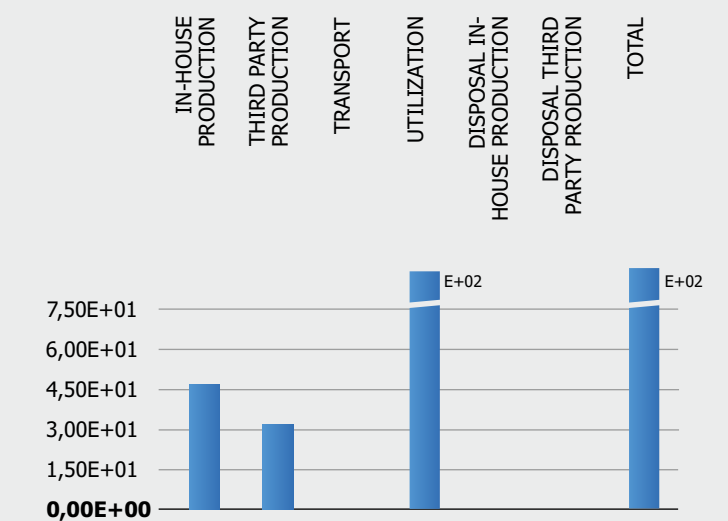
#### Terrestrial Ecotoxicity Potential

(TETP inf.) [kg DCB eq.]



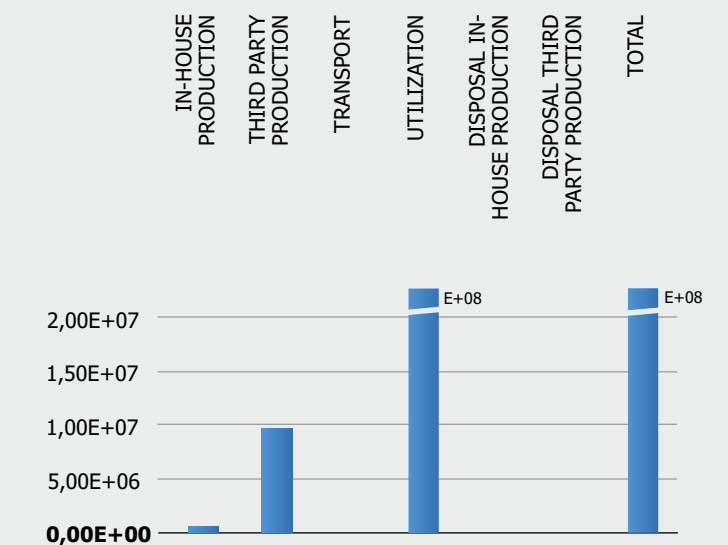
#### Freshwater Aquatic Ecotoxicity Pot.

(FAETP inf.) [kg DCB eq.]



#### Marine Aquatic Ecotoxicity Pot.

(MAETP inf.) [kg DCB eq.]





### Results of the Life Cycle Assessment

The study confirmed the assumption that the utilization phase is the dominating contribution in almost all impact categories. With the utilization phase, producing an AHU has noticeable effects in only two impact categories. Transport effects are considerably less significant for each impact category evaluated compared to the utilization phase. However, from an ecological point of view, this should not be grounds for neglecting the transport of AHUs. Optimization potential can also be identified here.

The production results are divided into in-house and third-party production. Thus, a more straightforward allocation or differentiation between in-house and third-party emissions becomes possible. Due to the substantial amount of steel required and processed for an AHU, steel also contributes considerably in many impact categories. The utilization phase exerts the most significant environmental influence in almost every impact category. For example, 99.8% of all CO<sub>2</sub> emissions are generated during utilization. Only 0.2% are generated in the other three phases: production, transport, and disposal. Given the long service life, disposal is often not an issue. However, disposal reduces the overall impact in some categories, mainly because recycling materials reduces emissions from primary production.



**99,8 % of Co<sub>2</sub> emissions arise in the utilization phase.**



**88,0 % of the environmental costs arise in the utilization phase.**



**85,0 % of the environmental impact during production can be compensated by recycling.**



Particularly in metals and plastics, corresponding ores do not have to be mined, and crude oil does not have to be extracted. After successful separation and sorting, the materials used can be melted down and, thus, reused. Of course, this is also not loss-free and usually requires a certain amount of energy input. However, in some impact categories, it causes fewer emissions than primary production.

This study shows that recycling an AHU can offset the environmental impact of its production by up to 85%. The ability to dismantle and recycle the construction of robatherm AHUs has already attained a high level. However, based on these results, recycling will be prioritized in future developments.

### Forecast

The study's results are essential for prioritizing further sustainability measures and confirming robatherm in its strategy. In particular, they illustrate that the most significant effect is in the utilization phase. For this reason, planning AHUs is of particular importance. It is here that the subsequent utilization phase can be influenced to a significant degree. Digital solutions such as "robatherm Connect" are also designed to lessen the impact of the utilization phase on the environmental footprint.

In the following studies, observing how additional components within the reference unit, or the integration of technologies like instrumentation and control technology or refrigeration, will change the results will be interesting.

### Do you have any questions?

In this sustainability report, we have only published a small excerpt of this study, summarizing the results as concisely and comprehensibly as possible. If you would like to delve into the life cycle assessment of an AHU in more detail, don't hesitate to contact us. We will be happy to discuss the analysis procedure and the individual results in detail and exchange ideas for future tests with you.





## 3.2 Digital Solutions

Suppose the high performance of air handling units is to be maintained in the future. Then, existing resources must be used more precisely, i.e., more sensibly and economically.

It was this motivation that led to the development of "robatherm Connect", a highly flexible platform that, on the one hand, bundles functionalities and, on the other hand, creates entirely new possibilities for efficiently operating AHUs.





More efficient motors and perfected casings remain important core areas. However, a quantum leap in air handling technology requires new ways of thinking. The desired result is a constant or even higher performance at lower consumption, less effort, and reduced costs. In short: greater efficiency at as many levels as possible.

#### Platform for Sustainable Relief

At the heart of the idea is "robatherm Connect", a highly flexible platform that bundles groundbreaking functionalities, from connecting heterogeneous AHUs at several locations to location-independent monitoring. Malfunctions can also be immediately analyzed online via remote access and remedied more quickly. In addition to trend analyses and regular reports, specific optimization potential is also displayed. The platform's benefits are as far-reaching as its perspectives, as robatherm Connect opens up almost limitless intelligent functions for enhanced performance. With a single login,

you can keep track of all the AHUs involved. It immediately becomes succinctly visible whether and where action is needed. For example, through a transparent presentation of collaborations or as a source of information for ideal service call preparation. Thanks to convenient control and rapid response, much effort can be saved during servicing. Conventional control trips are kept to a minimum so employees can be deployed in a more targeted and meaningful way. Thus, the platform is a benefit for the environment as well.

#### Performance with Future Perspectives

A characteristic of the platform is the elevated relief factor. Besides automatically generated reports, users are informed via monthly e-mail reports - for example, about operating times, energy consumption, or the degree of air filter contamination. In other words, "robatherm Connect" represents a change set to revolutionize modern AHUs performance. The opportunities are already impressive. Nevertheless, robatherm is already working on visionary expansion options. With the objective of higher efficiency, this raises new questions: Would an intelligent AHU provide air heating if a

high outside temperature called for cooling shortly after that? So could operations be regulated even more efficiently by forecasting actual future values? And could a comparison of actual and target values, based on correction, soon be room conditioning history? Questions that robatherm is intensively dealing with. The first steps have been taken with "robatherm Connect", but what we still have in mind is much greater. Here's where we see the future of air handling technology.





## 3.3 Our Contribution to Global Building Technology

**Efficient AHUs are essential in operating buildings in a contemporary and resource-saving manner. At the same time, AHUs provide air of the required quality to people living in buildings. AHUs from robatherm ensure that people worldwide breathe air made by robatherm every day and do so efficiently.**

### **Sustainable Companies Trust robatherm**

A look at robatherm's reference list, and the ranking of the 20 most sustainable companies in Germany in 2021, shows that sustainable companies often rely on robatherm for their construction projects. Of those 20 companies mentioned, 14 use AHUs by robatherm. The ranking was compiled by Statista and is based on the international ESG sustainability criteria. Among other things, these criteria consider environmental, social, and economic aspects of corporate leadership. When ranking companies headquartered in Europe, 53 % of them, and one in three companies worldwide, as listed in this ranking (according to Corporate Knights), remain on robatherm's customer list.

### **Sustainable Construction Projects with robatherm-Units**

Air handling technology alone will not make a building efficient. On the contrary, it is a crucial component in building technology. It only achieves efficient and sustainable overall results through successful interaction among all the trades involved. In the following pages, we'll present a small selection of projects representing future-oriented construction and relying on robatherm air handling technology.



On the following pages, discover trailblazing buildings where robatherm technology has become a viable building block of sustainable architecture. This is only a modest selection and illustrates how AHUs by robatherm contribute to a lasting and cutting-edge operation of buildings.



**Neue Siederei, Munich –  
A Digital Loft with a LEED Gold  
Certification as a Goal**

This place was once a pretty hot location in the middle of Munich. Soap products were made from fats, oils, and soda. The location is now developing into a new hotspot in the heart of Munich - entirely in the spirit of the new digital working world, namely, as an urban digital loft campus. Not only the roof terrace offers a magnificent farsighted view over the Bavarian capital. But the building itself does, as it was conceptually designed and proven by the desired LEED Gold certification. Furthermore, the Neue Siederei proves that efficiency, design, and functionality need not compete but merge into a greater whole.

11 AHUs by robatherm contribute significantly to the Neue Siederei. On the one hand, to achieve the LEED Certification and on the other hand, to provide pleasant working conditions. Ten had arrived in Munich, ready for connection, mounted on a DIN frame; the delivery and installation in downtown Munich could be carried out within the shortest possible time.





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**Center for Solar Energy and Hydrogen Research (ZSW), Stuttgart - A Façade Generating Energy and Serving Science.**

With its new institute building, the ZSW, short for Sonnenenergie- und Wasserstoff-Forschung Zentrum (Center for Solar Energy and Hydrogen Research), has created a new building combining modern technologies and expressive architecture. The ZSW's central research topic is the advancement of PV technologies, which is also visible in the new building. Three sides of the building and the roof serve as a surface to make the best possible use of solar radiation for energy generation. The ZSW employees also use the facade for testing purposes. The mounted solar modules are individually replaceable. In the field of air handling technology, the institute trusts robatherm's expertise.

A total of six AHUs by robatherm are in operation, demonstrating robatherm's wide range of services: Air handling units of the hygienic design per DIN 1946, an AHU equipped with special equipment for potentially explosive atmospheres, an AHU for targeted air-conditioning of different zones within the building, including direct steam generation.





### **Le Biotope, Lille (France) - An imposing example of sustainable construction in the heart of Lille.**

Set in the heart of the important European business district of Euralille, Le Biotope defines the city's skyline. Today, it is not only the quarters of the Métropole Européenne de Lille but also a landmark building promoting its users' well-being by providing a healthy indoor climate while at the same time having a positive energy footprint.

Le Biotope is living up to its name: After 19 months of construction, an imposing building has been created, featuring a soothing retreat surrounded by approximately 750 trees and shrubs on its vertically offset roof surfaces. Le Biotope is an impressive example of sustainable construction, as demonstrated by its awards from prestigious certifications such as BREEAM, WELL, BiodiverCity, E+C, and WiredScore. robatherm equipped Le Biotope with state-of-the-art air handling technology.

9 AHUs achieve excellent air quality coupled with optimum energy performance. Their capacity includes a total air volume of 195,650 m<sup>3</sup> per hour. Since the building's roof surfaces are extensively vegetated, most AHUs were installed in engineering rooms.

One of the robatherm units' strengths comes into play: Their flexibility makes it possible to keep the space requirements for air handling technology within the building to a minimum.





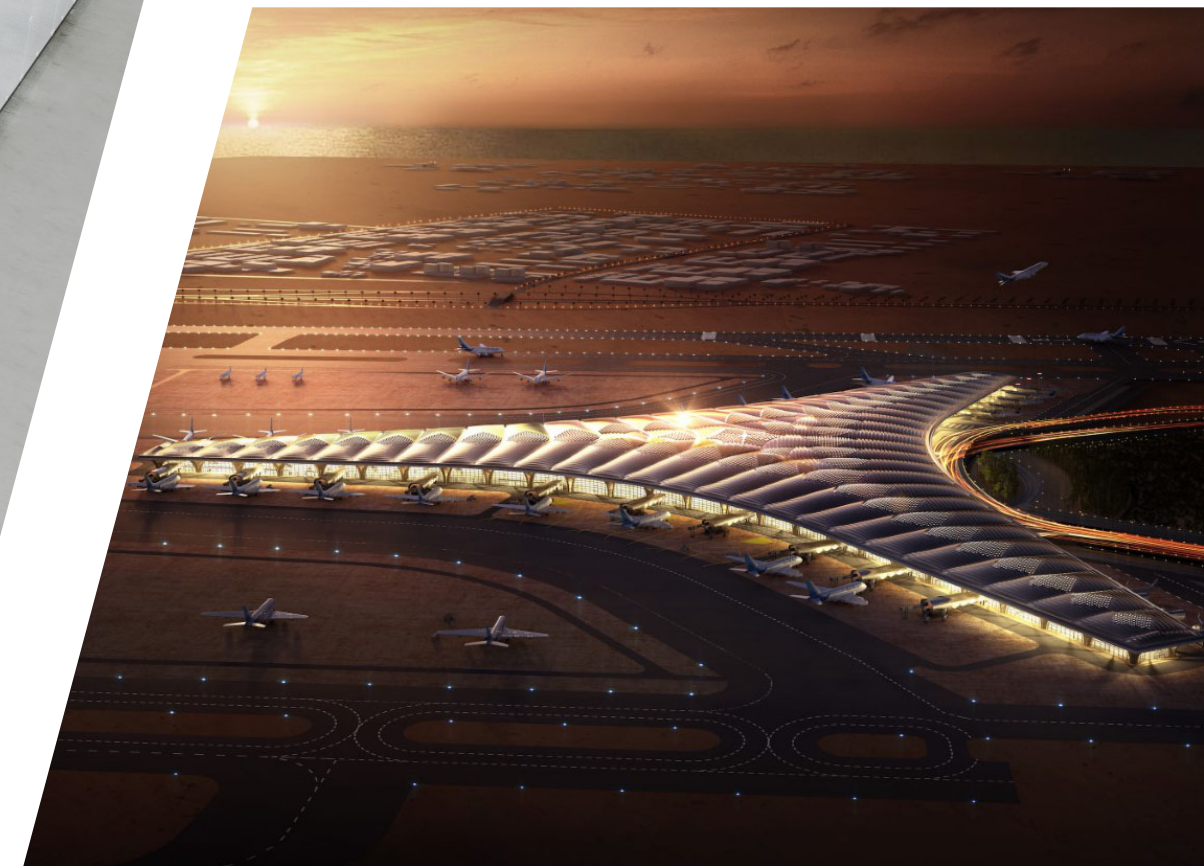


Factory Acceptance Test of some AHUs that are now in operation in Kuwait.

### **International Airport Terminal 2, Kuwait – A building project of superlatives with surprising benchmarks in sustainable building technology.**

The new terminal at Kuwait International Airport is an awesome example of sustainable air handling technology. Terminal 2 is expected to achieve the Gold category under the LEED (Leadership in Energy and Environmental Design) certification system, making the terminal the world's largest terminal with this honor. Around 42 °C [107.6 °F] outside temperature during the summer months and zero rain: There are more accessible places out there than in Kuwait to create pleasant indoor climates efficiently. The roof structure provides a significant contribution. On the one hand, it keeps the heat out yet allows daylight to filter through to optimize the use of artificial light sources. On the other hand, the roof surface also generates energy, thanks to the photovoltaic panels installed on it, which are intended to generate around 12 MW.

robatherm also plays a key role in achieving the desired gold certification, and this is not a coincidence. After all, LEED certification attaches great importance to air quality. robatherm produced a total of 225 air handling units for the new terminal. Treating 15 million cubic meters of air per hour as efficiently as possible was one of this project's challenges. In these dimensions, energy recovery is an even higher priority. While we usually speak of heat recovery in Europe, the same system also applies the other way around, in a simplified form as cooling recovery. For example, suppose the outdoor air temperature exceeds the consumed exhaust air. In that case, the temperature difference is used to cool the outdoor air. When using humidification, the air is also further cooled in an eco-friendly manner.





**Did you know?**

Bees' eyes consist of many individual eyes that combine to form two compound eyes. Drones have up to 10,000 individual eyes, so-called ommatidia. These compound eyes are suitable for seeing the surroundings sharply when the bees are in motion.

The bee also processes up to 200 frames per second. By comparison: Humans can only manage between 15 and 24 frames; with more frames, it begins to look like a film.

## 4. Environment and Energy





**Whether man or nature, we respect the available resources and treat them carefully. Whether modern buildings, machines, or material-optimized processing concepts, our locations meet the highest energy standards.**

As a company operating within the construction industry, we feel a greater responsibility to set good examples. In addition to the buildings on our premises, the focus is also on production processes to ensure consistently high quality in a resource-saving and efficient manner. We want to contribute to energy transition with our products and services and by operating our sites responsibly.





## 4.1 Efficient Building Technology

**Buildings can be impressive. However, they are only really fascinating if their design, function, and operation are compelling. One crucial element is facility management. Thanks to the experience gathered at the Jettingen-Scheppach site, robatherm is now more familiar with this broad terrain than one might expect from a company specializing in air handling technology.**

A central aspect of the headquarters in Jettingen-Scheppach is the high-quality building cladding and excellent insulation. This is due, among other things, to a double façade with thermal insulation glazing. In addition, an automated shading system is installed in the naturally ventilated maintenance aisle of the double façade, providing effective sun protection. On the other hand, the ground floor, almost entirely covered by a green mound, is protected from the heat influx from outside.





#### **Comfortable and Climate-friendly Controlled Temperatures**

Efficient heat control in the administration building is primarily achieved via heated and cooled ceilings. Whereas in the meeting area, a 4-duct system with 6-way valves enables automated switching between heating and cooling all year round. A 2-duct system with selectable settings to either heating or cooling mode is in use in the offices. Thanks to an air discharge velocity of less than 0.2 m/s, working without experiencing any drafts is possible. Selected areas also feature underfloor heating or even cooling. Keeping the building at the right temperature is one thing, but generating the energy needed to do so is another.

#### **Eco-friendly Interplay of a Variety of Technologies**

robatherm's commitment to efficient and future-oriented solutions was not limited to air handling technology. This commitment applies to the entire facility management system. The installation overview clearly shows that various technologies work together within robatherm's facility management. However, only the successful interaction of absorption refrigeration system, heat pump, photovoltaic system, combined heat and power plant, heat exchanger, and ice storage makes the operation of the building eco-friendly.





### Heat Pump

One central element is the water/water-heat pump that has been developed by robatherm. This is a switchable four-stage combined installation for cold and hot water supply. The challenge was balancing extremely low temperatures during winter operations and exceptionally high temperatures during summer operations, combined with an ice storage system. A unique feature is the process reversal within the refrigeration circuit and the use of four plate heat exchangers. Switching had to be done between separate circuits of glycol-water and plain water, so four plate heat exchangers were installed instead of just two. Process reversal in the refrigeration circuit can save a great deal of space within the machine room, as the pipelines and valves' nominal sizes are significantly smaller compared to the water circuit.

### Free Cooling

For the production of cold water, robatherm relies on free cooling. This particular variant incorporates the ice storage tank: If the temperature in the ice storage tank drops below 15 degrees Celsius, this medium is used to cool the cold water buffer tank. This typically enables the serverroom, for example, to be cooled in an eco-friendly manner from November to May.

### Absorption Refrigeration System (ARS)

Another efficient solution is the integration of an absorption refrigeration system. In this thermal compressor, water serves as the coolant and lithium bromide as the solvent. The components used at robatherm achieve a cooling performance of 65 kW and draws heat from the high-temperature buffer storage.

### Combined Heat and Power Plant (CHP)

The CHP could also be referred to as the heart of our energy and hot water production. It supplies the administration building with 50 kW of electricity and 80 kW of heat. During the winter, its power is used for heating. In the summer, the heat is used to operate the absorption refrigeration system to produce cold water. The economic and ecological advantage of the CHP is that robatherm puts all the energy to use directly on site.

### Photovoltaic System

A photovoltaic system was installed on the administration building's roof as a supplement to the CHP unit. Due to their East-West positioning, the 276 modules achieve lower peak output. However, thanks to their positioning, they generate electricity over a longer period of time over the day. Combined with the CHP, their share of selfgenerated electricity amounts to up to 75% of the wattage used by our administration offices in Scheppach.

### Ice Storage

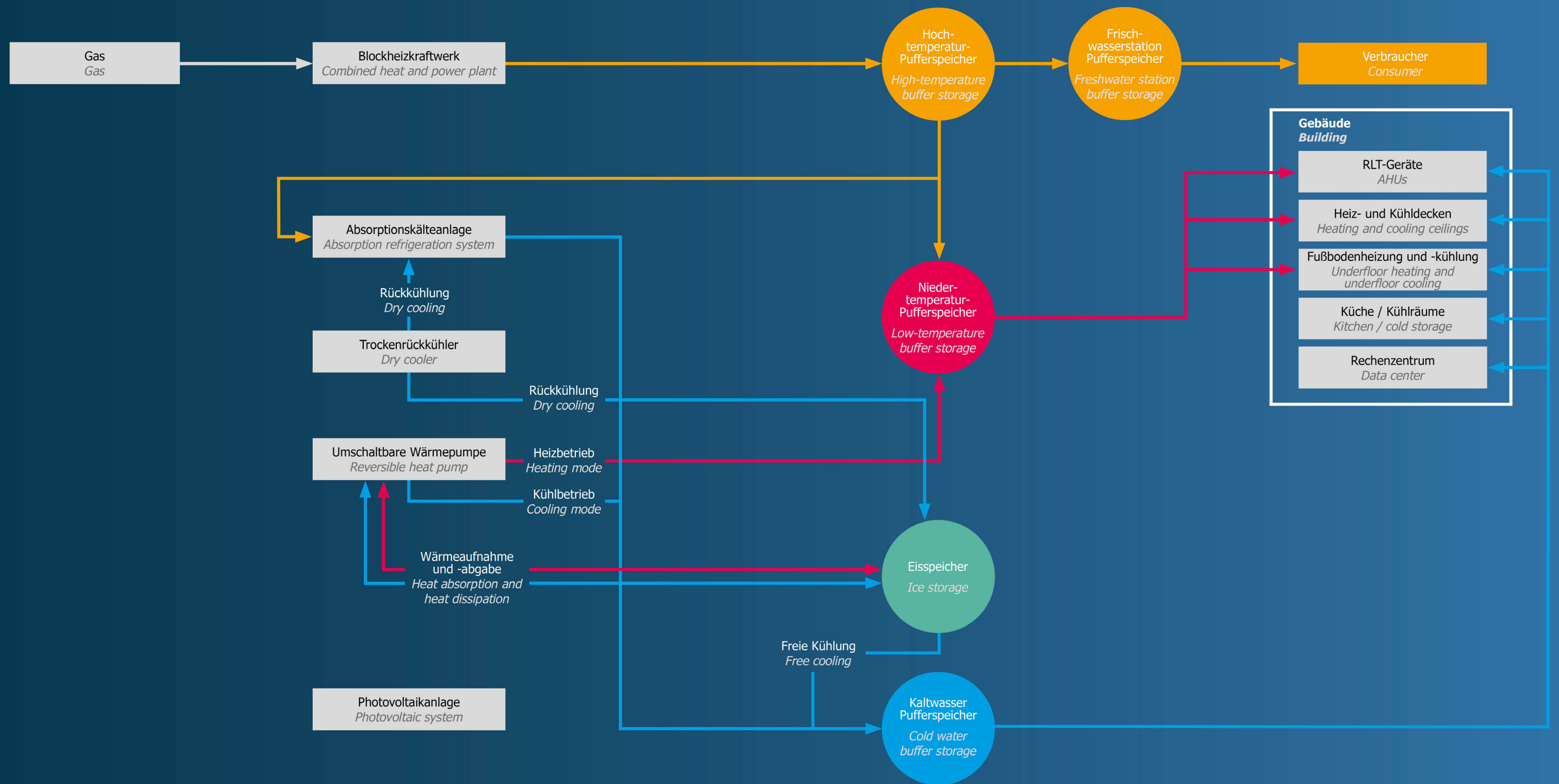
As so called latent heat storage, the ice storage can store energy all seasons long. Moreover, due to its feature of storing any waste heat, this technology barely loses any power. The storage system consists of an underground concrete basin holding a volume of 271 m<sup>3</sup> [9570.27 ft<sup>3</sup>] of water where a 4,275 m [14025.59 ft] extraction heat exchanger is installed. The water gradually freezes up from the inside to the outside by heat dissipation to the heat exchanger. By the way, during the transition to this solidstate of aggregation, the amount of heat released is the same as would be necessary to heat the same amount of water from 0° to 80° Celsius. To put it plainly: A considerable energy potential is made available during the winter months, which in turn, can be exploited throughout the year.

This is how the ice storage cools itself in the winter: By withdrawing warmth from the ice storage, the temperature drops and leads to the water icing up.

This is how the ice storage cools itself in the summer: In summer, the process is reversed, and it absorbs energy again. This means that the water changes from a solid to a liquid state of aggregation.

By cleverly combining ice storage and thermal pump, as well as absorption refrigeration system and combined heat and power plant, robatherm has created a solution for heating and cooling that is as environmentally friendly as it is economical.





Erzeugerkreis  
Generator circuit

Speicherung  
Storage

Verbraucherkreis  
Consumer circuit



### Indoor Climate from Our Own Facilities

A total of four robatherm AHUs supply the administration building with absolutely clean air. The design with its deep black casing is very striking. For permanently safe hygiene, its interior is antimicrobial powder-coated. Both plate exchangers and rotors are used for heat recovery. All air handling units correspond to the energy efficiency class A+ (according to EUROVENT). It is demonstrated in air handling technology and throughout facility management: The prudent use of resources is a top priority at robatherm.

### Automatically Adjusted and Centrally Regulated

To control, regulate and monitor the facility management system efficiently, robatherm relies on modern building control systems. This ensures that all components involved work optimally with each other and that their functions interlock seamlessly. Furthermore, thanks to our building control system, visualization, service, operational and error notifications, as well as operating records (trends), are bundled centrally.







## 4.2 Efficient Production

**The production of air handling units requires resources, including raw materials, water, and energy. At robatherm, we are well aware of this and strive to live up to this responsibility with resource-saving production.**

robatherm's mission is to ensure that air handling units by robatherm contribute worldwide to more efficiency in building services engineering. However, this also means the AHU and its production should be efficient. Therefore, for comprehensive consideration of sustainability, production enjoys equally high priority, reflected in various measures. Additionally, we work to continue improving our product's production and proportionally reduce resource consumption.





**Plastic Profiles**

We collect the waste profile sections we accumulate. Then, our manufacturers use this recovered material to produce new profiles. Moreover, our suppliers use old window profiles as recyclable material. Our drop eliminator profiles are 100% recycled material (re-granulate).

**Used Materials - Semi-Finished Products**

robatherm focuses on producing customized air handling units. In this respect, it isn't easy to quantify the installed components' quantities or weights. Therefore, the Life Cycle Assessment reference unit was also used as a reference in this case, resulting in the following weights per component or material.

**Components in the reference unit:**

- Filter **9 kg**
- Frequency Converter **8 kg**
- Differential Pressure Display **1 kg**
- Plate Heat Exchanger **457 kg**
- Heat Exchanger **29 kg**
- Silencer **3 kg**
- Louver Dampers **90 kg**
- Flexible Connection **8 kg**
- Fans **84 kg**
- Mounting Frames, Suspensions **457 kg**
- Measuring Line **1 kg**

**Components in the Reference Unit:**

- Steel **46,39 %** (643 kg)
- Aluminium **41,91 %** (581 kg)
- Zinc **6,49 %** (90 kg)
- Plastic **2,60 %** (36 kg)
- Rock Wool **1,23 %** (17 kg)
- Copper **0,94 %** (13 kg)
- Silicium **0,22 %** (3 kg)
- Glass **0,14 %** (2 kg)
- Stainless Steel **0,07 %** (1 kg)

**Used Materials**

AHUs by robatherm are made of a wide variety of components and materials. These include raw materials as well as semi-finished products. As every AHU by robatherm is different and customized, the quantities and materials used for each AHU may vary considerably.

**Steel**

Focusing on resource-efficient procurement, we prefer to source our sheet metal from Germany or nearby European countries. However, due to pandemic-related bottlenecks in the steel market, we had to, in exceptional cases, resort to purchasing from the global markets in 2021. Our supply sources have no detailed information about the proportions of recycled metal. Germany's share of secondary raw materials in crude steel is around 45% annually. Since we purchase the material predominantly from Germany, we can at least orient ourselves toward this rate without being able to substantiate it specifically.

**Copper**

The manufacturer of the copper we use estimates the recycled content, for the production of customer products, at 75.6%. This value is significantly higher than the German average, around 45%.

Our supplier also states that they intend to increase the share of recycled materials to 90% by 2030 and further develop circular business models in a targeted manner.

**Insulation**

Of the insulation we use, 24.6% is made of recycled material.

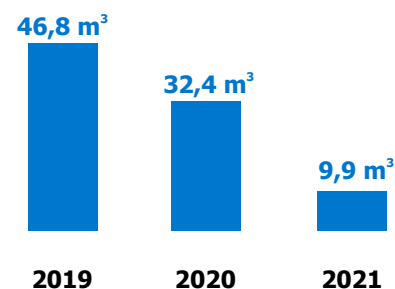


**Water Consumption and Wastewater**

robatherm draws the required water from the public municipal water network and feeds the wastewater back into the public municipal wastewater network. Water is mainly required outside production processes for sanitary facilities and building cleaning. Therefore, the kitchen area in the robatherm Restaurant is equipped with a separate wastewater treatment system that separates grease from wastewater. Additionally, there is a need for water for the air handling technology. Therefore, on the one hand, for air humidification and, on the other, for adiabatic cooling of production buildings, this is an environmentally friendly alternative to cooling by eliminating the use of conventional coolant.

Water is also required in production processes as a resource and mainly concerns the etching process for the posttreatment of welded stainless steel components. In May 2021, etching was replaced by an alternative posttreatment That brought about several advantages:

- The use of chemicals (caustic soda, calcium chloride, hydrochloric acid) for wastewater treatment no longer necessary.
- Waste product of electroplating sludge from wastewater treatment no longer occurs.
- Reduction of Water Consumption:



**Recycling Management**

Our AHUs are recyclable. At the end of their product life cycles, these components can be broken down into their basic components and, in most cases, reused. For example, our rock wool can be returned to the recycling loop. For example, our rock wool supplier has set up a waste-take-back service. The returned rock wool is completely recycled into the production process, which is processed into new wool, ensuring that resources used remain in the recycling loop and, in contrast to energy recovery, will also be available to future generations.

**Waste Prevention**

Every transport damage results in immense ecological and economic expenditure and unnecessarily consumes valuable resources. Therefore, the most sustainable packaging optimally protects our products against any damage on the way to the customer without wasting packaging material. We ensure this through regular staff training in the outgoing goods department. We also ensure this through the ingenious use of suitable packaging materials. The highest premise within the framework of our waste management is waste avoidance. Waste that cannot be avoided should be reused as best as possible or professionally disposed of separately if secondary recycling at robatherm is impossible. Considerable amounts of waste are generated mainly on the production lines. In this case, an internal key indicator, a so-called "scrap rate," is used to check and quantify the scrap and offcuts at individual machines. These key figures are also incorporated into the investment decision to replace individual machines. Waste in production mainly comprises metal and plastic. This waste is separated by material type at the plant for disposal. Besides this, lubricating oil and electronic scrap are incurred during equipment maintenance and repairs.

**Recycling**

Reusable packaging material is collected in the incoming goods department and used to pack our products. Examples include bulk materials, cushioned bags, and foam mats. A regional recycling company separates and returns wood, film, and other received packaging to the recycling loop.

**Padding Material**

Our padding material comprises 100% starch, a renewable raw material that is fully biodegradable. Regarding padding, we greatly value using renewable raw materials and deliberately avoid purchasing styrofoam.

**Wooden Packaging**

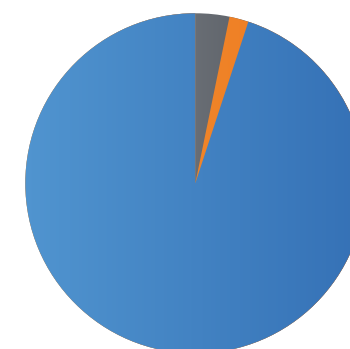
The main component of our packaging is made of wood, a 100% renewable and recyclable resource. Wooden packaging stabilizes and protects our products on their way to their destination and is made custom for each transport. We deliberately avoid prefabricated wooden crates. Experience has shown that these require more packaging material, contrary to the optimization of transport volumes.

**Packaging Film**

When it comes to the outer packaging of our devices, we attach great importance to recyclability. So we use a 100% reusable and 100% recyclable film. Our packaging films contain only one recyclable material, 100% polyethylene (PE). This material is particularly suitable for the recycling loop. Wherever possible, the packaging material is reused and recycled for shipping small parts in the company's outgoing goods department.

**Packaging in 2021**

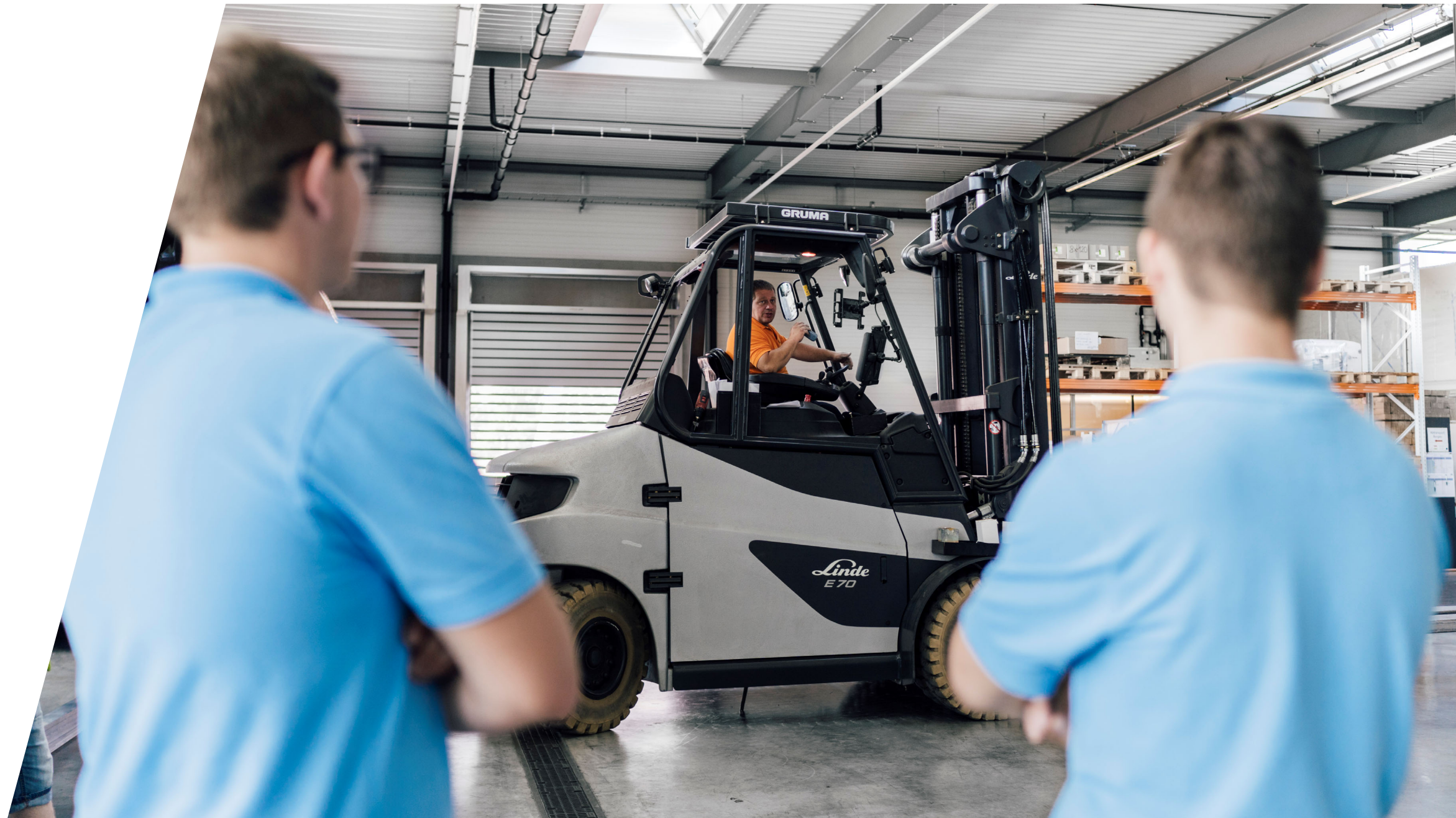
Wood	<b>697.287 kg</b>
Polyethylene (PE) film	<b>48.260 kg</b>
Metal	<b>12.721 kg</b>
Cardboard	<b>5.702 kg</b>
Adhesive tapes, stickers	<b>3.062 kg</b>
Other Plastic	<b>2.866 kg</b>
Padding Material	<b>141 kg</b>



Packaging in Volume [m³] 2021

- Wood
- Carton
- Padding Material





### 4.3 Contribution to the Energy Turnaround

**We believe the path to a successful energy turnaround is a never-ending process. We have taken a variety of measures to contribute to the energy turnaround. Regardless of that, we're still working to improve. We're already planning additional projects to drive the energy turnaround.**

At the headquarters in Jettingen-Scheppach, we exclusively run electric forklifts instead of diesel forklifts. Some of those electric forklifts still belong to the manufacturer's first generation. robatherm was one of the first customers to opt for this e-mobility approach in intralogistics. Other means of transport for intralogistics are also electric, eliminating the need for combustion engine drives and emissions inside production buildings.





Our vehicle fleet also increasingly relies on electromobility. For example, 45% of robatherm's passenger cars registered in Germany in 2022 have been hybrid or fully electric. In addition, an electric car is available in the vehicle fleet, which can be used for trips between the sites in Burgau and Jettingen-Scheppach.

In 2022, charging stations were installed at several parking spaces within our parking lot. These parking spaces are also available to electric vehicles from robatherm's fleet.

The sustainability strategy also included the Burgau site. Significant investments were made at this site, particularly in 2021 and 2022, to ensure its future viability and sustainability.

In April 2022, our hall lighting was converted from conventional fluorescent lamps to LED lighting. The exact figure saved will only be quantifiable in the future. However, the previous wattage for lighting was 100,000 kWh/year, meaning that significant savings can also be expected in this area.

Similarly, investments were made in air handling technology. robatherm's latest generation of AHUs replaced the previous AHUs. This upgrade alone will save over 50,000 kWh annually.

	AHU 1	AHU 2	AHU 3	AHU 4
<b>Installed electrical power (before)</b>	85 KW	85 KW	10 KW	30 KW
<b>Installed electrical power (new)</b>	56 KW	56 KW	7,5 KW	19 KW
<b>Savings in electrical power:</b>	<b>29 KW</b>	<b>29 KW</b>	<b>2,5 KW</b>	<b>11 KW</b>



# 5. People at robatherm

## Did you know?

Human-caused CO<sub>2</sub> concentrations have increased by 48 percent since 1850. An increase also occurred earlier, but for natural reasons and at a significantly slower rate. Before this, 20,000 years were required to achieve the same increase, which is now seen between 1850 and 2022.







**robatherm lives from its employees' ambition and sense of responsibility (both professionally and privately). We create the framework conditions that enable our employees to achieve this balance better and ensure their well-being in an optimal workplace environment employees.**

robatherm's human resource strategy rests on three pillars: Attracting suitable new employees, but above all, retaining high achievers of today and tomorrow, as well as training skilled workers of the future. As an employer, robatherm strives to contribute to attaining various SDGs. While in particular, robatherm's training policy is attributable to SDG 3, "Quality Education", robatherm equally aims to contribute to SDG 5, "Gender Equality", SDG 8, "Decent Work and Economic Growth," and SDG 10, "Reduce Inequalities".



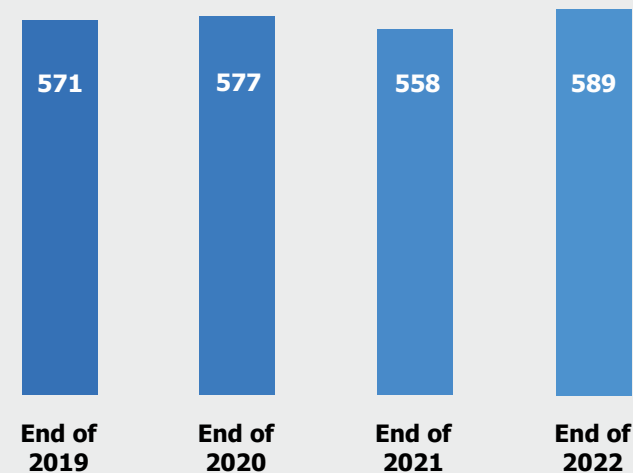
# 5.1 Facts and Figures

robatherm attaches great importance to organic growth, which also entails a change in the number of employees. New employees are recruited to employ them permanently and not to work off any short-term peaks in demand.

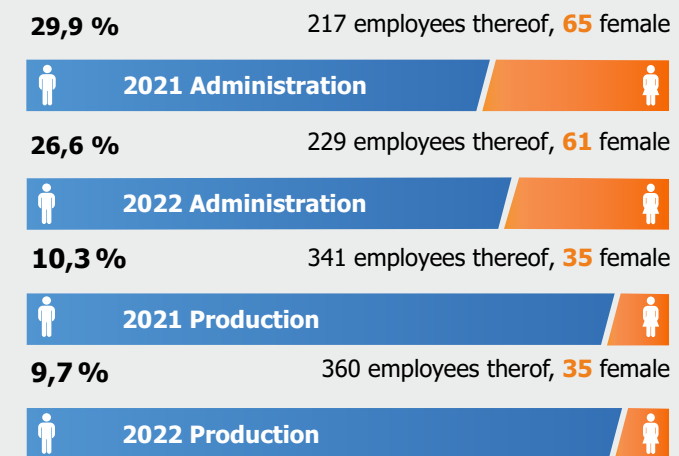
Thus, the number of employees continuously increases in the long term due to organic growth. Therefore, there will be no significant changes in the short term, let alone layoffs. The following facts and figures provide initial insight into the personnel situation at robatherm.

They also help better understand other topics in the chapter "People at robatherm", including diversity, occupational safety, and team member health.

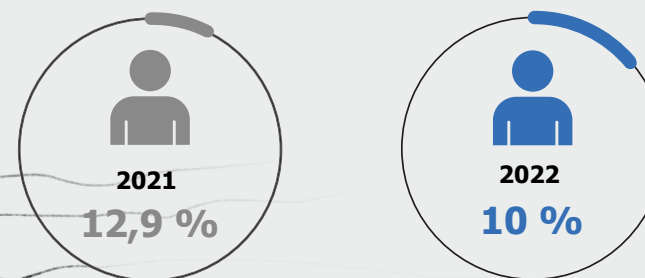
## Number of Employees



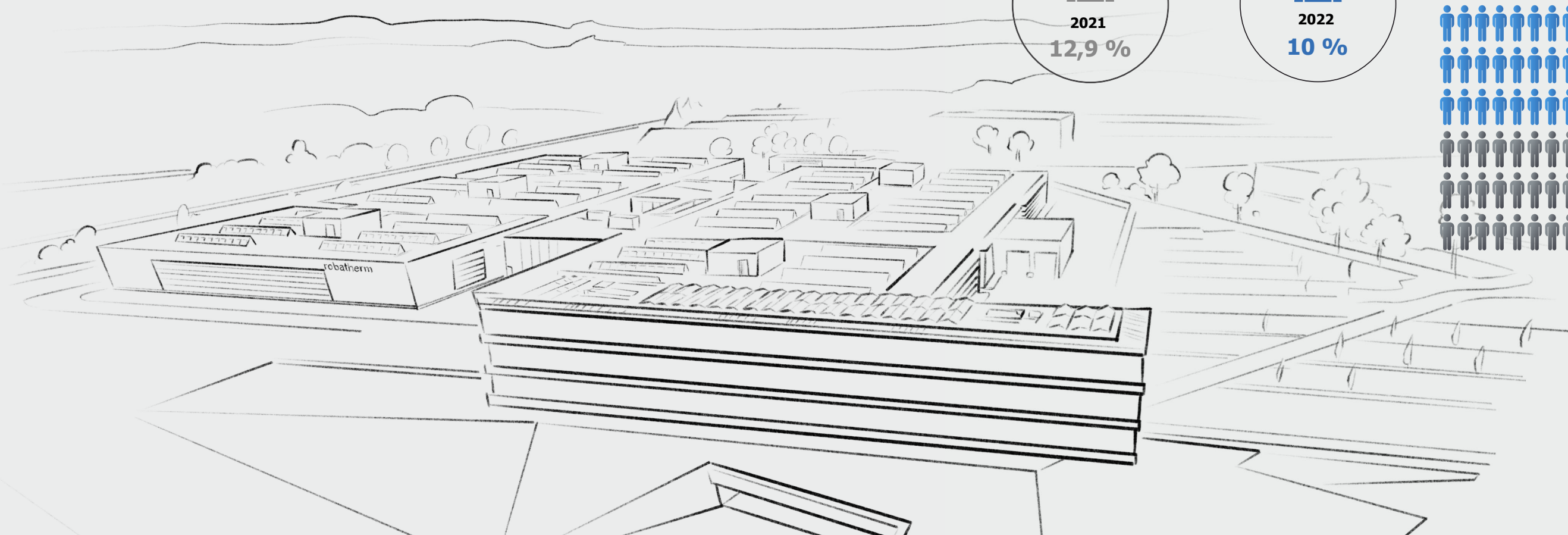
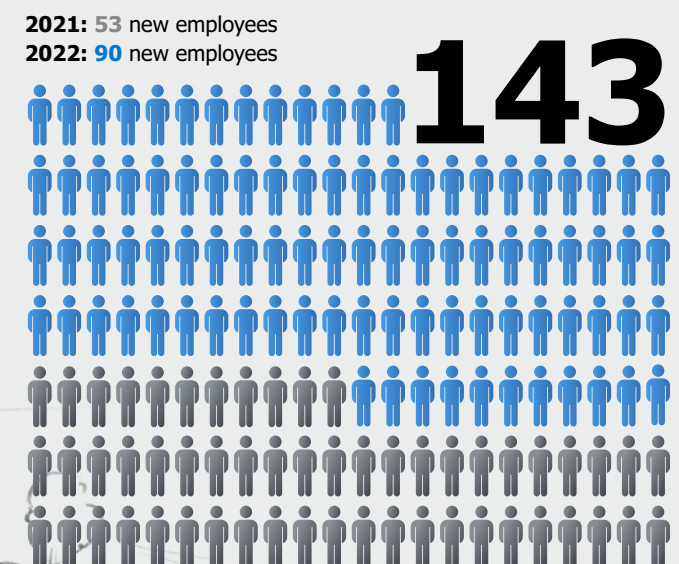
## Percentage of Women at robatherm



## Fluctuation Rate at robatherm



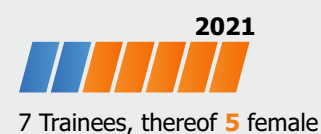
## New Employees:



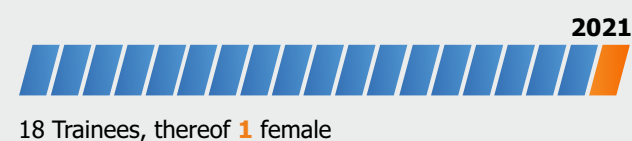


## Trainees at robatherm

### Commercial Trainees



### Industrial Trainees



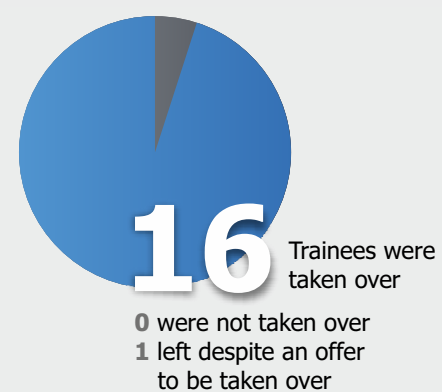
### Dual Students



### Takeover Rate 2021



### Takeover Rate 2022



## Employee Parental Leave

### 2021

28 Employees, thereof 8 female



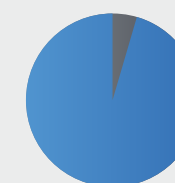
### 2022

30 Employees, thereof 11 female



### 2021/22 Return from Parental Leave

58 employees took parental leave thereof, 57 returned to work.



39 of 39 male employees are back to work.

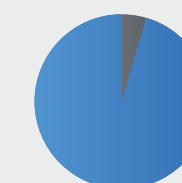


18 of 19 female employees are back to work.

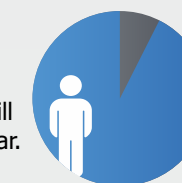


### 2021/22 Continued Employment after Parental Leave

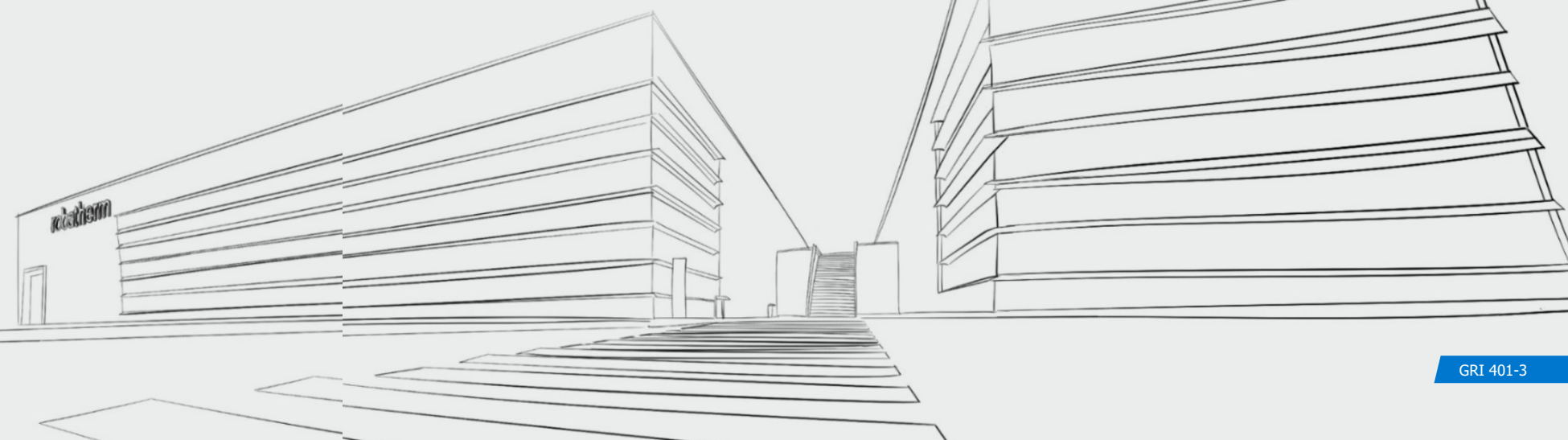
57 employees returned to work, thereof 54 are still employed after one year.



Thereof 36 of 39 male employees are still employed after one year.



Thereof 18 of 18 female employees are still employed after one year.







## 5.2 Employee Development

**Training and continuing education for our employees is essential in addressing the shortage of skilled workers.**



### Training and Studies at robatherm

Training has always enjoyed a very high priority at robatherm.

The training concept already supports students in choosing a vocational training profession.

Activities that are included:

- School partnerships with local schools
- Visits to informational events at schools
- Offers of internships within the administration and production departments
- Application training
- Participation in career information fairs
- Participation in Training Day 2022, featuring bus tours to potential training companies
- Participation in Girls' Day

robatherm attaches great importance to taking over trainees upon completion of their training, which is expressed when recruiting trainees. The number of trainees is based on the expected demand. Each trainee is recruited to be taken on following their training. When they start their training, trainees take part in a wide range of events and training courses. The objective is to prepare them in the best possible way for their upcoming training period. These preparations include informative events and team-building activities, such as visiting a high ropes course, enabling everyone to feel like they belong to the team as quickly as possible. The training involves becoming acquainted with various company departments, including commercial and industrial apprenticeships. Allowing trainees to develop their skills and interests better provides information about future areas of activity.

Industrial trainees attend their training center equipped with state-of-the-art machinery and tools. They learn the basics at the beginning before working in different areas of the company during their training.

Furthermore, robatherm constantly works on remaining an attractive training company. Events intended for trainees only, such as joint excursions or the Trainee Food Day, where trainees are informed about healthy nutrition and can cook in the robatherm Restaurant, are worth mentioning here.

robatherm's comprehensive exam preparation helps trainees complete vocational school and, thus, their training in the best possible way. Receiving accolades regularly confirms robatherm in their chosen training strategy.

For example, in the fall of 2022, five industrial apprentices were taken over at the end of their training. Three of them received an award as School Best in their apprenticeship profession. In addition, one became the third Chamber Winner in all of Bavaria.





**Further Education**

For us at robatherm, work is more than just a purpose in itself:

Every person strives to use and develop their skills, be successful, and receive recognition for doing so. Only those who experience trust and know themselves can tap into their full potential and perform to the best of their ability. Within our lean and structured organization, the joy of work, space for creative self-development, and the sense of purpose in one's actions are paramount. Based on this commitment, we encourage and challenge our employees, give them responsibility early, and develop them into tomorrow's high achievers.

Therefore, the point of further education not only includes assistance in attending further education courses but also support in personal and professional careers. It is part of robatherm's human resource strategy, To identify ways for



Occupying positions with management responsibility (per GRI 202-2) with **in-house** and **external specialists**.

employees to move up the career ladder within a company and not necessarily change employers. Numerous examples at robatherm prove this. For example, 71% of the "senior managers" (according to GRI 202-2) were already at robatherm, and individuals from the outside filled the other share. Assistance with further training is initially provided by offering in-house training courses. robatherm also offers financial support for third-party basic and advanced training. Equally possible is to grant study leave with a job guarantee. It is also possible to adjust weekly working hours during further training periods.

**Feedback**

An open dialogue culture means that the employer communicates and listens. As part of regular feedback meetings, all employees receive an evaluation. Usually, as a rule, feedback meetings take place every 1 to 2 years. However, these meetings can be held more frequently upon the employee's request or ad hoc. For new employees, feedback is provided during the orientation period at shorter intervals (after two weeks, then in the 3rd, 6th, and 12th months of employment). The feedback system was comprehensively revised and updated in 2021 to promote this and establish uniform standards.





## 5.3 Diversity and Integration

**At robatherm, we help each other. We respect each other in our diversity and personality. People from over 30 different nations have been successfully working together at robatherm. To express these values, they are also reflected in robatherm's mission statement.**

We place great value on collaboration, which is evident, among other things, in very heterogeneous teams within the production department. Orientation is facilitated through personal mentors. In addition, new employees have a specific contact person within their immediate work environment. robatherm rejects, without exception, any discrimination or other disparagement, but also any preferential treatment of employees or business partners based on their ethnic origin, gender, religion, disability, age, or other characteristics. We aspire to ensure a work environment free of discrimination and harassment.

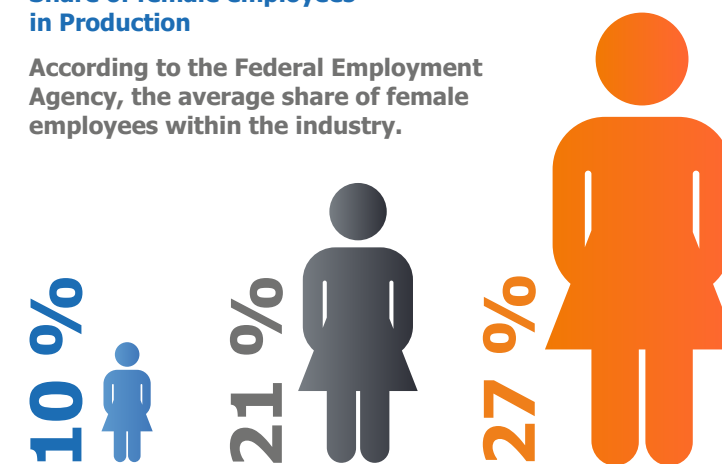
In 2022, female employees were 27 % in the administration and 10% in production. This low rate is mainly because these fields of activity primarily attract men's interest.

By participating in Girls' Day, but also by offering additional internships for interested girls, robatherm is trying to counteract that. robatherm also deliberately uses testimonials from women who work in the production area and visualize that these are by no means "men's jobs".

**Share of female employees in the Administration**

**Share of female employees in Production**

According to the Federal Employment Agency, the average share of female employees within the industry.





## 5.4 Employee Satisfaction



**robatherm stands for technology, sustainability, and reliability. With an air handling unit, we are driven to provide our customers with an evolving premium package; this is only possible with a strong team. We want to create framework conditions that allow our employees to contribute in the best possible manner and be happy to stick with robatherm. In this regard, one key initiative was introducing a company mission statement in October 2022 to continue to be collectively successful.**

At the end of 2022, all employees were requested to contribute and anonymously share their opinions on various aspects concerning the mission statement and any suggestions for improvement. From the results of the comprehensive and detailed survey, measures will be derived to create a good working environment for employees in the future. We place great value on excellent working conditions. Among other things, this is demonstrated by ergonomic workplaces, workwear, and the cleaning thereof free of charge for employees working in production, ample sanitary facilities, and modern and high-quality equipment.

Additionally, robatherm significantly invests in voluntary social benefits that cover both full-time and part-time employees, regardless of their type of employment contract. Company benefits such as medical care, pension plans, life insurance, or even the offer of parental leave apply to every team member, regardless of whether that team member works full-time or part-time.

Voluntary social benefits for 2021 and 2022 comprised, for instance, the following:

- Company restaurant (free lunch for all employees, including flat-rate taxation and operating costs): 1,528,000 €
- Employee Voucher Card: 486,000 €
- Workwear, Safety Shoes, and Equipment: 326,000 €
- Allowance for Capital Formation Benefits: 192,000 €
- Beverages (Coffee, Tea, etc.): 100,000 €
- Corona-Bonus 2021: 200,000 €
- Energy Price Flat Rate 2022: 129,000 €
- etc.

In total, there were, therefore, social benefits to the value of 3,028,000 €. Employee voucher cards are worth around half a million euros. Employees at robatherm receive a monthly tax-free credit on their card. They can use this credit to make purchases at selected stores.

The free lunch at the robatherm Restaurant helps employees maintain a balanced diet. The robatherm Restaurant was recognized by Food&Health in 2022. It was among the top five restaurants in Germany in both the indulgence and sustainability categories. Decisive menu planning is a careful selection of all the ingredients. The Head Chef pays close attention to seasonal products of regional origin. Fruit and vegetables, for example, are preferably sourced from neighboring farmers. At the same time, fish comes from a fishery a few kilometers away. Short transport routes are an essential step towards greater sustainability. After all, not only do they ensure remarkably fresh produce, but they're also a bonus for the environment.







3 GOOD HEALTH AND WELL-BEING



8 DECENT WORK AND ECONOMIC GROWTH



## 5.5 Occupational Safety

**Occupational safety and protecting our employees' health are very important to us. Extremely high standards in equipping our production sites and workplaces and the organization of our work processes bear witness to this.**

All occupational accidents are recorded, documented, evaluated, and measures derived from them, to improve our safety level continuously. As a matter of principle, work areas and workplaces are subjected to a risk assessment. In addition, the company physician and the occupational safety specialist conduct company rounds twice a year. Before starting work, new employees receive initial training to familiarize themselves with the operational conditions and aspects of occupational safety and health protection in their new workplace.

In addition, regular safety briefings are held on general and current topics. Safety briefings are held on specific occasions, e.g., when workflow changes introduce new machines or auxiliary equipment. Of course, the instructions take place during working time. They are held by the manager in charge and other knowledgeable persons. Our employees should work in a healthy and safe workplace environment. In the period under review, this included occupational safety, particularly in production, and protection against infections in response to the Corona pandemic. The "Employee Health" chapter outlines the protective measures in more detail.





## 5.6 Employee Health

**The Corona pandemic once again demonstrated the high value of health. As an employer, robatherm can contribute by creating framework conditions for employees, enabling them to work safely and healthily, and promoting their health through additional measures.**

### Healthy Food

The robatherm Restaurant contributes significantly to a healthy and balanced diet. The free food offer encourages people to break their usual eating habits and try different foods. In this way, the amount of meat consumed in the Restaurant per employee was reduced, and the proportion of vegetarian meals increased. In addition, a beverage offer is also complimentary.

The "Healthy Food" topic also came into the trainees' focus. In 2021, the very first "Trainee Food Day" took place. An ecotrophologist informed the trainees about the correlation between nutrition and health and the significance of regional and seasonal foods. The trainees experienced this first-hand as they were invited to harvest pumpkins in a field and learned more about sustainable agriculture from a farmer.

Afterward, they went to the robatherm Restaurant, where the harvested pumpkins were made into a meal in the kitchen. This meal was offered to the employees during their lunch break. After its successful launch in 2021, the Trainee Food Day was repeated in 2022. In the future, it will be a fixed part of robatherm's training plan.

### Ergonomics

Almost one in three adults complains of back pain more often or constantly (Source: Statista, November 2022). There are numerous reasons for this; inadequate exercise, the one-sided strain on the movement apparatus, and predominantly sit-down occupations could be the causes. By designing workplaces ergonomically, robatherm wants to be proactive in this area. Every workstation in the administrative department is equipped with a height-adjustable desk. For example, standing aids are available at the production machines, and height-adjustable work platforms are available in the assembly area. Likewise, the safety shoes meet the highest requirements, not only in terms of safety but also in terms of wear comfort and ergonomics.

### Medical Care

New employees are provided an initial examination by the company physician. After that, regular health checks are given. The frequency and scope of the examinations are based on the workstation requirements. The regular examination results are only provided to the employee for personal preventive care. robatherm only learns about the fact that the examination appointment has been made.

### Covid-19 Protection

Thus, in 2020, as well as in the 2021 and 2022 reporting period, measures were taken to protect the health of our employees, to minimize the risk of infection as far as possible. These included distance regulations, hygiene guidelines, and the distribution of free rapid tests and FFP2-masks. Individual protective measures for employees who belong to risk groups should also be listed. These measures also include the deliberate decision not to hold face-to-face trade fairs; in some cases, these were possible again in the first half of 2021. A vaccination offer initiated by robatherm resulted in every employee having the opportunity for a first vaccination as early as July 2021.



**Did you know?**

The rise in temperatures results in severe consequences. Heat waves are already claiming many lives. Seniors or those with health problems are particularly at risk. Development is challenging in those countries suffering most from the heat and with no means to protect their populations.

## 6. Ethics and Social Affairs





**At robatherm, we understand the compliance issue as behavior conforming to the rules. Therefore, our in-house guidelines exceed the statutory framework conditions. Our Code of Ethics defines these values and principles.**

We also aim to fulfill our social responsibility. By sponsoring, we support various organizations and associations that benefit the community and our environment.





In response to the challenges in the procurement market since the outbreak of the Corona pandemic and the start of the Ukraine war, we see ourselves confirmed in our strategy. Together with our suppliers, we are handling this situation cooperatively and successfully. Explicitly, there have not yet been any investigations or reviews involving our suppliers to ascertain how their business activities align with our ideas of sustainable and ethical business practices. In the future, we'll strive for greater transparency in this area as part of our sustainability strategy; this will coincide with the publication of the robatherm Code of Ethics in the spring of 2023. In it, reference is also made to the supply chain. We expect our suppliers to actively implement the values and principles in this Code of Ethics, not only in their own company but also in their supply chain. In the future, when selecting new suppliers, we will pay even closer attention to compliance with minimum requirements as early as the selection process. We'll also be paying even more attention to the issue of sustainability and ethics right from the start of the business relationship. In the Code of Ethics, robatherm is also committed to ensuring that illegal behavior on the part of our suppliers or violations of our values will result in sanctions, up to and including termination of the business relationship without notice.



## 6.1 Procurement

**Our goal has always been future- and market-oriented cooperation with our suppliers. We attach great importance to cooperation, not only with our customers but also with our suppliers.**

GRI 102-9

GRI 408-1

GRI 409-1

GRI 414-1

GRI 414-2



## 6.2 Personal Data Protection

**For us, protecting privacy when processing personal data is paramount in our business processes.**

We process personal data in compliance with the provisions of data protection law. We also inform about this in the data protection notices on our website. These provide detailed information about our handling of customer data.

Information about us or our business partners is always treated with the utmost confidentiality. It may not be disclosed to unauthorized third parties. This confidentiality also extends beyond the termination of the employment or business relationship. The use of confidential information for personal gain is not permitted. We regularly invest in our IT infrastructure to maintain the functionality and security of our IT systems.

For the reporting period and the period before, we can confirm that we have not received any substantiated complaints regarding the handling of data from customers or other business partners.







## 6.3 Social commitment

**robatherm is a globally active company without losing sight of our roots. robatherm aspires to be a stable and reliable regional partner and is socially committed.**

A key element of our commitment is toward the children living in the region around our sites. Independent of our school partnerships, we support local schools. So, for example, we help schools buy mountain bikes or equip them with iPads, which wouldn't be possible with the school budget. robatherm also supports associations throughout the region. Voluntary work is of great social importance. For this reason, robatherm deliberately supports various local associations to encourage voluntary work, strengthen the region's cultural and sporting offerings, and promote charitable initiatives.

### An excerpt of our social commitments in 2021 and 2022:

- Raphael Hospiz Verein Günzburg
- Initiative „Schattenkinder“ der Lebenshilfe Günzburg
- St. Ulrich Kindergarten Scheppach
- Fitnessgeräte für Trimm-Dich Pfad der Stadt Burgau
- Bayerisches Rotes Kreuz Burgau
- Mittelschwäbischer Luftsportverein
- Trachtenkapelle Scheppach
- Förderverein Grundschule Scheppach
- St.-Thomas-Gymnasium Wettenhausen
- VfR Jettingen
- Seniorengemeinschaft Landkreis Günzburg
- Pfarrkirche St. Nikolaus Dürrlauingen
- Lions Club Günzburg
- Rotary Club Schwäbischer Barockwinkel-Thannhausen
- ESV Burgau
- Katholische Jugendfürsorge - Mutter-Kind-Einrichtung
- etc.



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**Do you have any questions?**

Sustainability is a topic that concerns us all. Several employees have submitted their contributions to the Sustainability Report. For any questions concerning the Sustainability Report, please feel free to contact the following person:

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