

EDITION 2022/2023

VAILLANT GROUP

Taking care

...

REPowerEU

Energy markets
in upheaval

Making

the heating
transition happen

Climate strategy

New forest in
Costa Rica

...
of a better
climate.

Inside each home
and the world
around it.

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€3.65

billion in revenue

In 2022, the Vaillant Group again significantly increased its sales revenue compared to the previous year.

The very strong demand for electric heat pumps contributed to growth. Sales in the segment were more than 75 per cent higher than in the previous year. The Vaillant Group produced more heat pumps in 2022 than ever before.

Support and protection for our colleagues in Ukraine

As early as February 2022, the Vaillant Group started as quickly as possible organising shelter and assistance for all of our approximately 70 Ukrainian colleagues and their families. The first priority was the safe accommodation of women, children and other family members. Special thanks are due to the colleagues from Ukraine's neighbouring countries to the west – Poland, Slovakia, Hungary and Romania. With great personal commitment, the accommodation and initial care of those who had fled the war were ensured there immediately. However, solidarity and overwhelming willingness to help came from all parts of the Vaillant Group and in many cases on private initiative.



Fundraising campaign for SOS Children's Villages in Ukraine

With donations, Vaillant Group employees supported the humanitarian aid for children and families in Ukraine provided by our partner SOS Children's Villages. At the end of the fundraising campaign, €255,000 was handed over to the SOS Children's Villages. The Vaillant Group and "SOS Children's Villages worldwide" have been linked by an international partnership since 2013. The company has already supported the children's aid organisation in 23 countries – with highly efficient heating technology and social projects.

WORTH KNOWING

How a heat pump is made



A virtual tour shows how a heat pump is created at the Vaillant Group. 360-degree panoramas and videos with in-depth information offer a glimpse into the development area, the state-of-the-art test centre and the production process. You can access the tour via the QR code and via the website www.vaillant-group.com.



Suppliers boost capacities for heat pump production

At the Heat Pump Supplier Summit in June 2022, the Vaillant Group reached agreements with around 60 suppliers essential for heat pump production to secure supply chains in the coming years. The Vaillant Group has been expanding its heat pump production capacity for years. Several important suppliers have also agreed to increases in their delivery capacity.



Vaillant 9.21 Festival in China

In China, the pronunciation of “9.21” sounds similar to “it will be 21 degrees”. For this reason, a large-scale sales campaign was launched under this motto for the second time in 2022. More than 1,000 showrooms and 5,000 in-store promotions, pop-up stores in shopping centres in Shanghai, Xi’an and Wuxi, as well as a social media campaign in which more than 25,000 people participated, helped to further increase sales and brand awareness of Vaillant in China.



Journalists visit “Heart of the Energy Transition”

“Welcome to the Heart of the Energy Transition!” At the Heat Pump Day in September 2022, industry journalists from HVAC and building technology trade media were given an exclusive insight into the Johann Vaillant Technology Center and the heat pump production of the Vaillant Group. Lectures and workshops centred on the boom in demand for heat pumps and the potential of this environmentally friendly technology in existing buildings.

WORTH KNOWING

First 100% hydrogen appliance installed in UK

As part of H21, the first Vaillant heating appliance to use 100 per cent hydrogen has been installed in South Bank, Middlesbrough. On a trial basis, odourised hydrogen is fed into an existing gas grid. H21 comprises several projects that are intended to prove the suitability of the gas grid infrastructure for hydrogen.



New national sales company in North Macedonia

The Vaillant Group expanded its network of national sales companies in 2022. The new NSC in North Macedonia will in future be responsible for the further development of the business in the region of Southeastern Europe.

BCM measures in the production network

As part of the Group-wide Business Continuity Management (BCM), the Vaillant Group audited the energy supply situation throughout the entire production network in 2022. Preventive measures were taken to safeguard production operations and thus the company's ability to deliver.

Vaillant Group terminates business activities in Russia

Since the beginning of the war in Ukraine, the Vaillant Group had suspended deliveries of heating appliances to Russia. In August 2022, the company decided to end the sale of products and services in Russia and to terminate its business activities in the country. The Russian sales company based in Moscow has been sold to a local investor.

MAKING THE HEATING TRANSITION HAPPEN

The changing face
of the Vaillant Group





Taking care of a better climate.

Inside each home and the world around it.

Since 2016, this has been the vision of the Vaillant Group. That was also the point in time that strategic focus was placed on environmentally friendly heat pump technology. Including the projects currently underway, investments in the expansion of the continuously growing heat pump business amount to almost €1 billion.

Europe is pushing the pace: ten million new heat pumps are to be installed by 2027. Demand for the energy-efficient, low-emission technology is growing and growing. The Vaillant Group anticipated this development. The strategy, product portfolio and production network are geared up for it. The investments for this amount to almost €1 billion. Depending on future market growth, additional investments of up to another €1 billion are planned in the coming years for the further growth of production and development capacities as well as the development of digital services related to heat pumps.

DRIVING THE ENERGY TRANSITION IN THE BUILDING SECTOR

The decision to develop heat pumps into a core business area of the company was preceded by intensive observation and analysis of markets, technologies and environmental and sociopolitical trends. "We recognised early on that heat pumps could be the key technology for the energy transition in the building sector. In terms of energy efficiency and climate footprint, hardly any technology rivals the heat pump, especially in combination with electricity from renewable energies," explains Dr Ansgar Kernder, Director Group Strategy Development and M&A at the Vaillant Group. "We have assigned the segment a high strategic priority and aggressively ex-

panded the heat pump business in the Vaillant Group's European markets."

Just how serious the swift implementation of this strategy was for the company becomes apparent from a look back at 2017. In order to drive forward Europe-wide sales, all competencies and expertise were pooled at that time in a new business unit. As a company within the company, the Business Unit Heat Pumps located in Remscheid combined all the expert knowledge from marketing, sales, planning, market research, business management, product management and finance with a clear mission: to become as strong with heat pumps as the company is with gas-fired heating appliances.

Adel Pour, now Director Group Sales Management at the Vaillant Group, was part of the team from the very beginning: "The new business unit gave company-wide visibility to the strategic importance of the heat pump. We got the necessary resources and support, so we could create the necessary structures and processes to achieve the growth targets." One task was to help the European

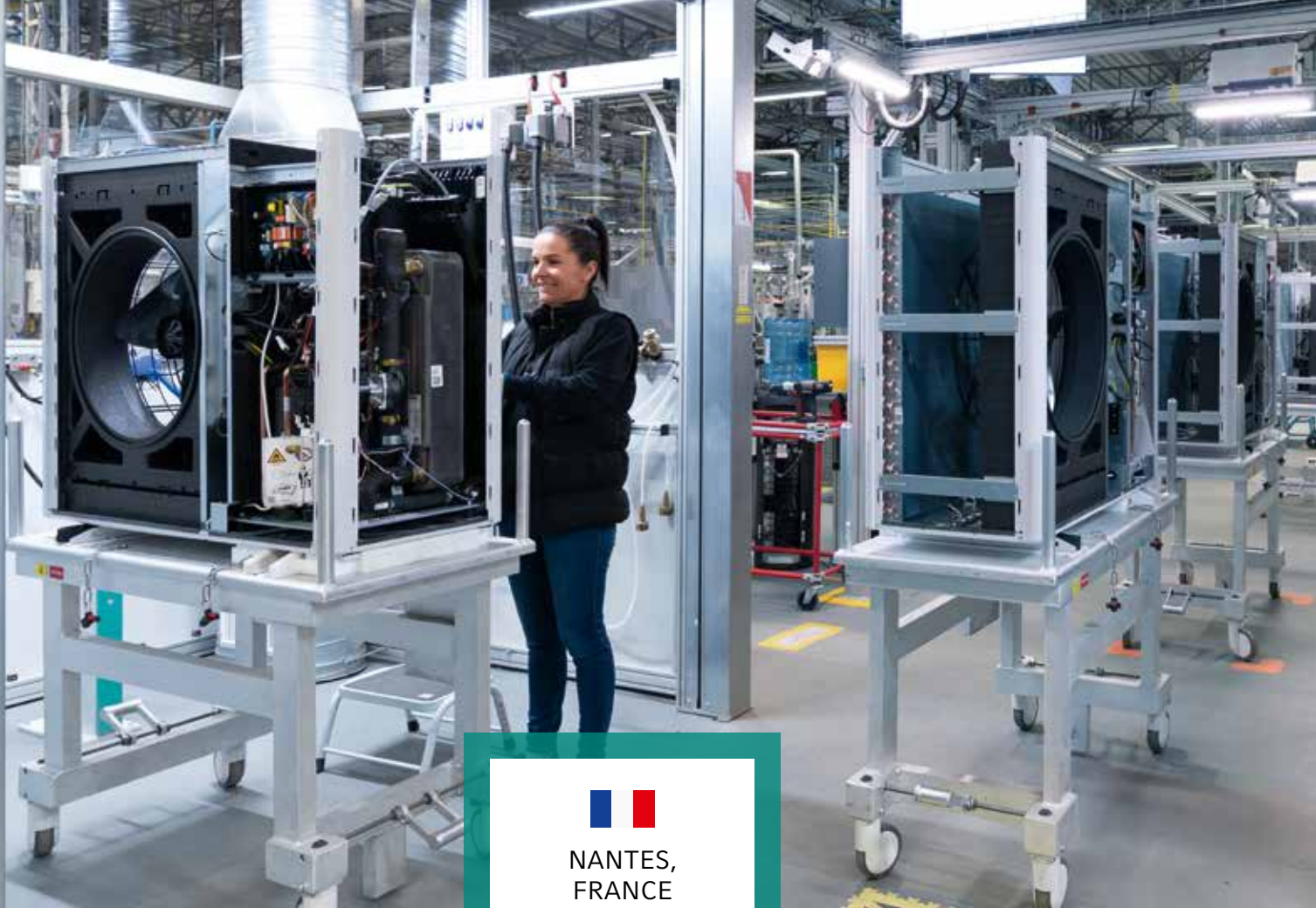
national sales companies with marketing. Another: to transfer knowledge about heat pump technology through the business unit's own academy. For several years, the Business Unit Heat Pumps together with the sales companies built and shaped the international marketing and sales structures. "At that point, the heat pump business had reached a volume that no longer justified the separation," says Adel Pour. Today, the heat pump business is fully integrated into the existing organisation, and it has been the most dynamically growing product segment for years.

HEAT PUMP PRODUCTION SITES

-  **Nantes,**
France
-  **Belper,**
United Kingdom
-  **Remscheid,**
Germany
-  **Senica,**
Slovakia

<ul style="list-style-type: none">▶ Start of development of modular heat pump platform▶ Production ramp-up in Nantes	<ul style="list-style-type: none">▶ Decision to use R290 as refrigerant for heat pumps	<ul style="list-style-type: none">▶ Start of production in Remscheid	<ul style="list-style-type: none">▶ Decision to build the first mega factory for heat pumps	<ul style="list-style-type: none">▶ 45,000 HVAC specialists trained across Europe▶ All new heat pump developments with R290▶ Launch of production in Belper	<ul style="list-style-type: none">▶ Commissioning of mega factory for heat pumps in Senica
2016	2018	2019	2020	2022	2023





NANTES, FRANCE

The plant in Nantes
was the first company site
to produce heat pumps,
starting as early
as 2008.



INNOVATION ENGINE OF THE HVAC INDUSTRY

Product development, on the other hand, was permanently concentrated in a dedicated unit. The Vaillant Group invested around €54 million in the construction of the Johann Vaillant Technology Center. The state-of-the-art research and development centre serves as an innovation engine room. Interdisciplinary teams have been working there collaboratively on new products and technologies and on optimising the portfolio since 2019. "Thanks to the proximity to the Remscheid plant, the development teams can tailor prototypes, module groups and components, as well as assembly handling, directly to the subsequent production processes," says Elmar Zippel, Director Group R&D Heat Pump Integration. Beforehand, all new product developments pass through the test factory. The qualification and testing of all performance characteristics of new products are carried out down to the smallest detail – service life, safety, temperature resistance, electromagnetic compatibility and noise emissions. The cooperation of all functions involved in product development allows innovation cycles to be shortened.

A milestone in heat pump development was achieved even before the opening of the development centre. Following a development period of around two years, the first heat pump platform with the natural refrigerant R290 was launched in 2018. The use represented an important innovation. The company relies on the natural refrigerant R290 because it does not contain any health-endangering chemicals. The refrigerant is particularly environmentally friendly due to its low global-warming potential and delivers high flow temperatures. "Thanks to its special thermodynamic properties, R290 permits flow temperatures of up to 75 degrees Celsius, even when temperatures outside drop below zero. This is the key to replacing old heating appliances with heat pumps in the existing building stock," explains Alberto Ruiz de Larramendi, the Vaillant Group's Director of Heat Pump Development.



The market potential is growing tremendously as a result. The ability of heat pumps to provide heating and hot-water convenience not only in new buildings but also in older, less insulated existing buildings opens completely new doors for the technology. From 2025, the Vaillant Group will bring only heat pumps with natural refrigerant to the market.

PRODUCTION CAPACITY GUARANTEES DELIVERY CAPABILITY

For quite a long time, the Vaillant Group's production network was primarily centred on the manufacture of gas-fired heating appliances. As recently as ten years ago, heat pumps were still being produced in much smaller quantities. Demand for the high-efficiency technology was generally limited to parts of the new construction sector. Those days are long gone. Elmar Bossmann heads the planning and realisation of new factory locations within the Vaillant Group. "As the driver of the heat pump transition, industrial manufacturing had to redesign and reorganise its processes. First, we ramped up capacity at the Nantes and Remscheid plants in several successive steps. Then we also started manufacturing heat pumps at our English plant in Belper," he explains. "In parallel with the capacity expansion in the existing plants, we started

building a new plant just for the production of heat pumps." The choice of site fell on Senica in Slovakia, where the Vaillant Group already operates two manufacturing facilities: an assembly plant for gas-fired heating appliances in Skalica and a module plant in Trenčín. "We are not starting from scratch, but can draw on the local network, the experiences and resources of the existing sites," says Elmar Bossmann. A look at the figures shows the extent of the production increase that is taking place: from 2016 until the end of 2022, the Vaillant Group has raised its production capacity fourfold. That, however, is not the end.

Investments are also being made in the depth of production. The number of electronic components for

heat pumps is about three times as high as for gas-fired heating appliances. To meet the growing demand for special components, the Vaillant Group is increasingly relying on in-house production of modules and electronic parts. In times of tense procurement markets and massive price hikes, this also makes the company more independent of upstream producers and supply chains.



demanding and in some cases require special expertise. The high complexity and the depth of the manufacturing level of heat pumps also pose an additional challenge for logistics." A distinctive feature of the Remscheid plant is the attached electronics centre. The electronic modules for the heat pumps are manufactured there. Together with the neighbouring R&D hub, the Johann Vaillant Technology Center,

GLIMPSE INTO PRODUCTION

Since 2008 – long before the first heat pumps under the Vaillant brand were manufactured in **Nantes** – the plant there has been producing heat pumps for the Vaillant Group's French brand, Saunier Duval. It was easy to build on this expertise. Today, the heat pump production in Nantes is carried out in multiple assembly lines in parallel. The plan is to set up an additional line before the end of the year. The products manufactured at the site in Nantes no longer go predominantly to the French market; 70 per cent are destined for export throughout Europe. Several hundred specialist employees currently make up the heat pump production staff at the site. "Our team has been growing steadily for several years," says Plant Director Yuna Josse. "We are particularly proud of the fact that we have as many women as men in the workforce." To make room for the additional heat pump production, the assembly plant in Skalica, Slovakia, is now producing some of the gas heaters previously manufactured in Nantes.

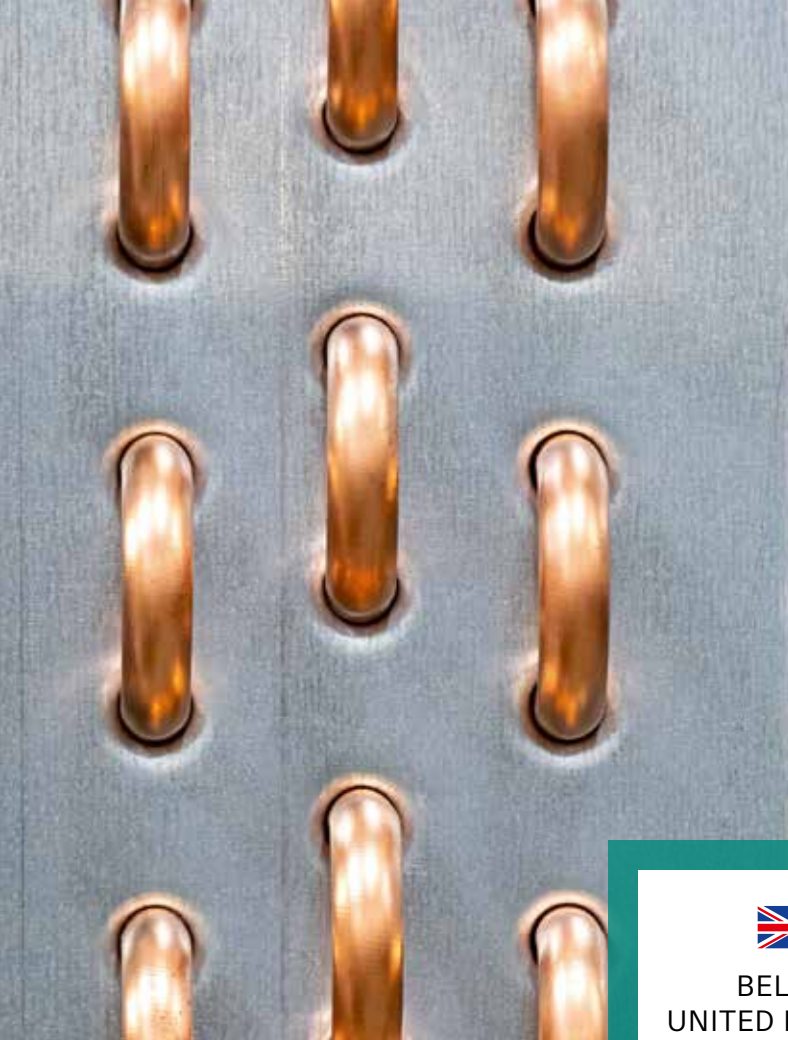
Space for additional heat pump production was also created in **Remscheid** through the relocation of other parts of production to different sites. The state-of-the-art assembly lines for heat pumps at the Remscheid plant set the standard for the layout of the production design at all Vaillant Group manufacturing sites. "The production of a heat pump is generally much more complex than that of a gas heater," explains Plant Director Lutz Forßmann. "Significantly more individual parts are required, assembly takes longer, the manufacturing processes are more


the site has become a European centre of excellence for heat pumps. "This is the place where industry innovations are brought to technical maturity and afterwards become industrialised," says Lutz Forßmann. "This concentrated, cross-divisional competence is a strong asset of the Vaillant Group and accelerates the transition of our business in Europe very significantly."

In the autumn of 2022, the Vaillant Group became the first major heating technology manufacturer to start production for the still relatively small but growing British heat pump market out of **Belper**, England. "With the launch of our local production in September 2022, we will be able to directly serve our local customers' heat pump demand. In doing so, we are supporting the country's transition to low-carbon technologies," explains Plant Director Joseph Dunn. The Vaillant Group is currently the only heating technology manufacturer to produce both heat pumps and high-efficiency condensing boilers in the UK. Although the local market for heat pumps is comparatively small, rapid growth is expected in the coming years. The British government aims to have 600,000 heat pumps installed annually by the year 2028.

A preliminary highlight of the capacity build-up is the new heat pump factory in **Senica**. It alone will raise the heat pump supply capability to a whole new level. "The largest and most modern heat pump production centre of the Vaillant Group is being built here," sums up Radovan Prístavok, who as Head of Production in Slovakia is responsible for all production plants in the country. Operations are scheduled to start at the mega factory Senica in May of 2023. Then the Vaillant Group will have doubled






**BELPER,
UNITED KINGDOM**

Since September 2022, the Vaillant Group has been the only heating technology manufacturer to produce both heat pumps and condensing boilers in the UK.





REMSCHIED, GERMANY

At the Remscheid plant, newly developed heat pump models are brought to industrialised and large-volume production.



production capacity to well over 500,000 heat pumps per year. The site will also include a large logistics centre. Visitors will later be able to view the entire production shop floor from above from a glass sky-walk. The new production facility is certified according to the highest international standard BREEAM for sustainable, environmentally friendly construction. The mega factory uses electricity from 100 per cent renewable sources and is heated with heat pumps.

CLOSE PARTNERSHIP WITH SUPPLIERS AND INSTALLERS

For the assembly of steadily increasing numbers of heat pumps, the Vaillant Group requires equally large quantities of materials and prefabricated components. In order to fully utilise the developed capacities of the plants, the continued strategic development of partnerships with suppliers is absolutely necessary. The existing supply chains are being expanded and diversified continuously and in a targeted manner. To achieve this, the Vaillant Group involves suppliers in business development and technology innovations at an early stage. New partners are integrated into the supplier network. Last but not least, the supplier partners themselves invest heavily in expanding their own capacities.

On the opposite side of the value chain lies the deepening and advancement of technical know-how among partners in the HVAC trade. After all, heat pumps not only have to be produced, but also installed. "We want to encourage our professional HVAC trade partners to

work together with us to shape the market transition and get fit for heat pump technology," says Juliane Krüger, who heads the Vaillant Group's Technology Learning Excellence unit. To this end, she and her team have developed an international digital learning platform. Specialist HVAC tradespeople can refresh and expand their knowledge on the platform with more than 500 online opportunities for self-guided training around the clock. Depending on their level of prior knowledge and existing expertise, they can acquire basic skills and qualifications, in-depth expert knowledge, or certification. Currently, the digital learning platform of the Vaillant Group is available in six countries in the respective national languages. From 2024, it will be available free of charge for all markets. The digital knowledge source has been very well received by the installers, around 45,000 of whom across Europe already use the content on a regular basis.

LOOKING AHEAD AND LEADING THE WAY

The transformation process of the Vaillant Group is in full swing. The strategy is long-term. "At some point, markets where gas-fired heating appliances are just now being installed nationwide will also be ready for the heat pump. Then we'll already be well positioned," says strategy expert Dr Ansgar Kernder. Medium- and long-term planning has already taken place. Further investments have been initiated. Additional plants are in planning and construction. The Vaillant Group is well prepared not only for the current boom in demand, but also for growth in the coming years.



SENICA, SLOVAKIA

The mega factory, the Vaillant Group's largest and most modern heat pump production facility, will start operation in May 2023.

Since 2016, investment in heat pumps of

€1 billion

– further investments of
the same amount planned

The English production site in **Belper** has been manufacturing heat pumps since September 2022. The output is destined for the local market. Capacity expansions at the site are already in the planning stage.

Belper

Remscheid


Bergheim


Roding

Nantes

The **Nantes** plant produces heat pumps of the Vaillant brand and the Saunier Duval brand. The plant supplies appliances for the demand in the European core markets.

Vitoria

 Sites with
heat pump
production

 Other R&D
and production
sites

The site in **Vitoria**, Spain,
is a centre of excellence for the
development of refrigeration
circuits for heat pumps.

More than

50%

of the production
area for heat pumps

Increased production capacity
for heat pumps

400%

from 2015 to 2030

The plant at the company's headquarters in **Remscheid** has been producing heat pumps in large quantities since 2018. The proximity to the Johann Vaillant Technology Center makes it possible to industrialise new product models and production designs here.

Skalica

Trenčín

Senica

The Vaillant Group has built Europe's largest and most modern heat pump plant in **Senica**, Slovakia. Production will be launched at the mega factory in May of 2023.

Group-wide capacity for well over

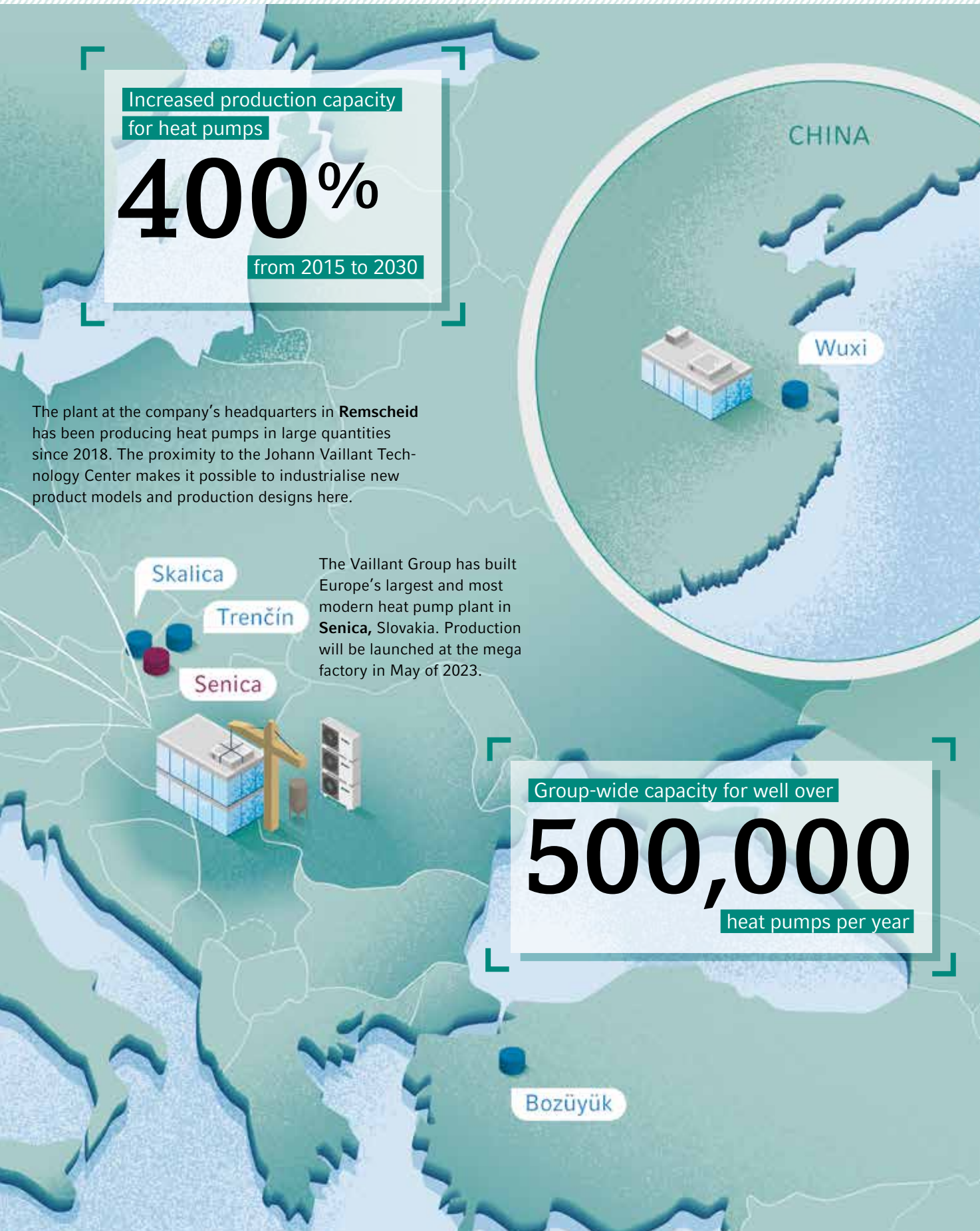
500,000

heat pumps per year

Bozüyük

CHINA

Wuxi



INTERVIEW

“We are aiming to become as strong with heat pumps as we are with gas-fired appliances today.”

Klaus König, Vaillant Group
Managing Director Industrial

→ Why is the Vaillant Group investing so heavily in production and R&D at the moment?

← These are key areas for the transformation process of the Vaillant Group into the leading supplier of electric heat pumps. The company has been making the necessary high investments for this for some time and we will continue to make them in the coming years as well. The investments are essential to maintain and expand our leading competitive position.

→ Where can you see the transformation of the heat pump business most noticeably?

← In the product portfolio. We have suitable heat pumps for different types of buildings. Profitable growth is only possible with the right portfolio. Another focus is on the expansion of production capacities and the supplier network on the one hand and on digitalisation and the associated new business models on the other. In addition, we also support

cooperations with our specialist partners in the HVAC industry to make the installation, operation and maintenance of heat pumps easier and more efficient.

→ What are the main priorities in heat pump product development over the coming years?

← We are broadening our portfolio in the basic segment and in the larger-output classes. The third focus is currently on further optimising energy efficiency, both in terms of the heat pumps themselves and the overall system.

→ What future do you expect for the business with gas-fired heating appliances?

← There are use cases for which heat pumps are not ideally suited. There will still have to be gas-based solutions or hybrid systems in the future – especially those that work with green gases such as hydrogen and biogas. Some markets are only now transforming from coal to gas. China could be mentioned as an example. We at the Vaillant Group are very well positioned because we offer different technologies and are very familiar with the requirements of our markets.

→ The procurement markets were very tense last year. Do you expect any improvements in the foreseeable future?

← The challenges in 2022 were of a very particular nature, because we saw supply bottlenecks in all material groups. Currently, we are beginning to observe an easing of the situation with regard to availability in many material groups. In recent years, we have qualified new suppliers in order to increase security of delivery. Long-term and intensified cooperations have been agreed with important suppliers.

→ What do you say to customers who have to wait a long time for their heat pump?

← On the production capacity side, the Vaillant Group can meet the growing demand. We have increased the production output again in 2022 despite all the difficulties in procuring raw materials and electronic components. However, we cannot fully control external market conditions. Looking ahead, I expect that in 2023 most delivery commitments can be served faster than was possible in the previous year.



→ **The EU is planning far-reaching changes to energy and climate policy. What is your position on this with regard to the company?**

← Regulatory frameworks at the EU and national levels significantly impact markets and product requirements. By 2027, ten million additional heat pumps are to be installed in Europe. This is a clear commitment to sustainability and CO₂-neutrality. This change is already triggering a push in the heating technology industry. I firmly believe that these developments are an opportunity for the Vaillant Group as the world market leader in central heating appliances. At an early stage, we took the steps to massively expand our heat pump business.

→ **The whole of Europe is experiencing an energy crisis. What is the company's contribution to counteracting this?**

← The Vaillant Group is driving forward the energy transition in the building sector. We are well pre-

pared on the manufacturing side for fast-growing and large-volume demand for electric heat pumps. The development of hydrogen heating appliances is well advanced. In addition, the Vaillant Group is achieving substantial energy and CO₂ savings in all business areas and processes as part of an ambitious climate strategy that aims for the CO₂-neutrality of the entire company in the long term. In this way, the company is making a contribution to achieving the United Nations' 1.5-degree target.

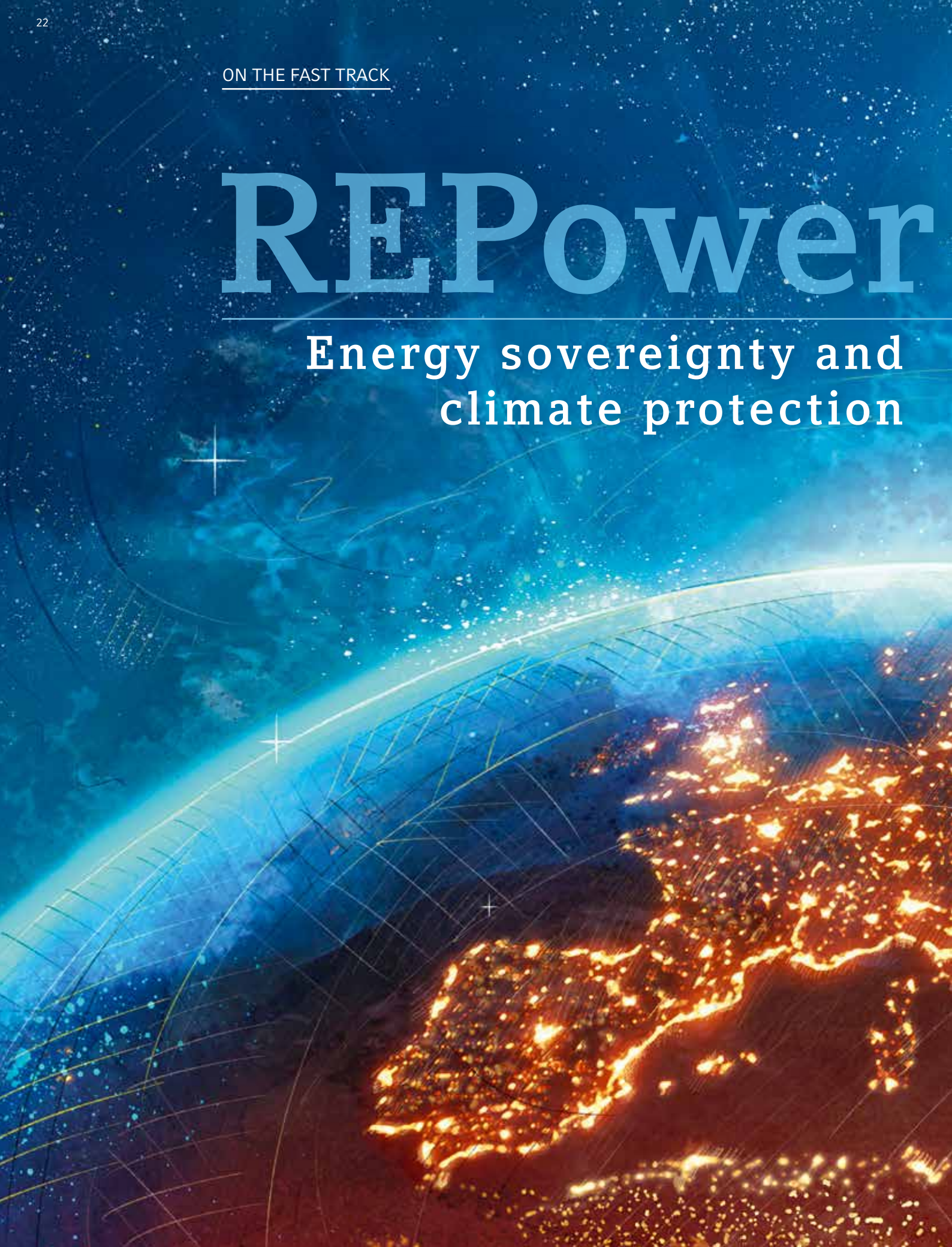
→ **Where do you see the Vaillant Group in ten years' time?**

← I do believe that in the near future we will see parity in the turnover from gas-fired appliances and that of heat pumps. I also think that we will be seeing an annual doubling in the heat pump business, both in terms of the market and our manufacturing capacity. The goal is to be as strong with heat pumps by 2030 as we are today with gas-fired appliances.

ON THE FAST TRACK

REPower

Energy sovereignty and
climate protection



EU

Brussels wants to make Europe's energy supply more independent. The rapid expansion of green energies and the switch to heat pumps on a large scale are intended to contribute to this.

The heating industry must prepare for major changes.

T

he German university town of Tübingen shows on a small scale how the energy transition can succeed. New constructions and public buildings are required to be fitted with solar panels. The municipal utilities generate electricity from hydro and wind power. The sewage treatment plant and a textile factory provide district heating. Heat pumps are subsidised. There is even a pilot project for the production of green hydrogen.

This is the way things should soon look from Finland to Portugal, if the EU Commission is to have its way. Down with energy consumption – up with electricity and heat from renewable sources. By 2050, Europe will be the “first climate-neutral continent”, promised Commission President Ursula von der Leyen in December 2019 when announcing the Green Deal. Funding of €600 billion was to be earmarked for this purpose.

With the war in Ukraine, Brussels’ energy strategy was given a new and additional challenge: the diversification of gas supply, which is intended to remove dependence on Russian deliveries and to keep energy affordable for households and industries. To this end, and for the accelerated expansion of renewables and energy savings measures, the EU Commission is activating a further €300 billion by 2030 as part of the REPowerEU initiative.

“The Green Deal and REPowerEU focus attention for the first time on the much neglected heating sector,” says Federica Sabbati, Secretary General of the Association of the European Heating Industry (EHI) in praise of the initiatives. With one number, the Italian documents how indispensable the sector is for the targeted green transformation: “Buildings account for 40 per cent of primary energy consumption in Europe. It is good that this potential is coming more into focus.”





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*The Green Deal
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sector.*
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First, more diversification

Diversification of energy imports is the most urgent goal of the REPowerEU plan. This involves coal and oil, but above all natural gas. Natural gas is not only important as a raw material for the chemical and steel industries – many private households also depend on gas supplies, especially for heating.

In order to broaden the distribution of natural gas to Europe in the future and to avoid dependence on individual states, the EU Commission and the member states want to set up an energy procurement platform. Interested parties from the individual member states can jointly buy gas, liquefied natural gas (LNG) and hydrogen via this platform. European gas demand is to be bundled for purchasing in the future.



The EU Commission assumes that the procurement platform could lead to a trading volume of about 30 to 70 billion cubic metres in the short term. It is clear that the European natural-gas-exporting countries, Norway, Great Britain and the Netherlands, will not be able to provide the required quantities on their own. Other sources are needed, specifically for LNG, such as the USA and the Gulf region.

It is certain that the diversification of gas sourcing will burden all stakeholders – states, companies and consumers – with rising costs. This increases the pressure on homeowners, for example, to switch to alternative heating systems. These range from heat pumps to energy storage units or solar installations.

The EU therefore assumes that the demand for natural gas in Europe will decrease noticeably. The “Fit for 55” programme launched in 2021 already called for a 30 per cent reduction in gas consumption and a 55 per cent reduction in CO₂ emissions by 2030. The REPowerEU plan accelerates these processes further.



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An EU energy procurement platform is to enable the individual member states to jointly purchase gas, LNG and hydrogen.
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Second, **save more energy**

There is agreement in Brussels on the need to save energy. European companies and consumers share a common responsibility. The goal is to further decouple growth and prosperity from energy consumption. The savings potential is high. Just by lowering the temperature in homes and offices, using less hot water, working from home, avoiding unnecessary car journeys or switching from air to rail, the equivalent of 220 million barrels of oil could be saved annually – enough to heat 20 million households. But above all: these savings take effect immediately. And they cost nothing.

Brussels is not stopping at appealing for savings. About three quarters of all buildings in the EU are not energy-efficient. They are therefore to be refurbished to increase their energy efficiency. Many details are still unsettled. What is certain, however, is that the annual modernisation rate in the building stock must at least double. So far, it has fluctuated between 0.4 and 1.2 per cent, depending on the member state.






When it comes to heating technology, the EU Commission is banking on heat pumps. In the next five years, ten million additional systems are to heat Europe's homes and offices. By the end of the decade, as many as 30 million units are to be installed.

Across Europe, around 4.8 million hydronic heat pumps are currently installed, 1.2 million in the leading French market alone. In 2021, one million systems were added. This means that about one in seven newly installed heating units is a heat pump. REPowerEU is expected to drive the number even higher.

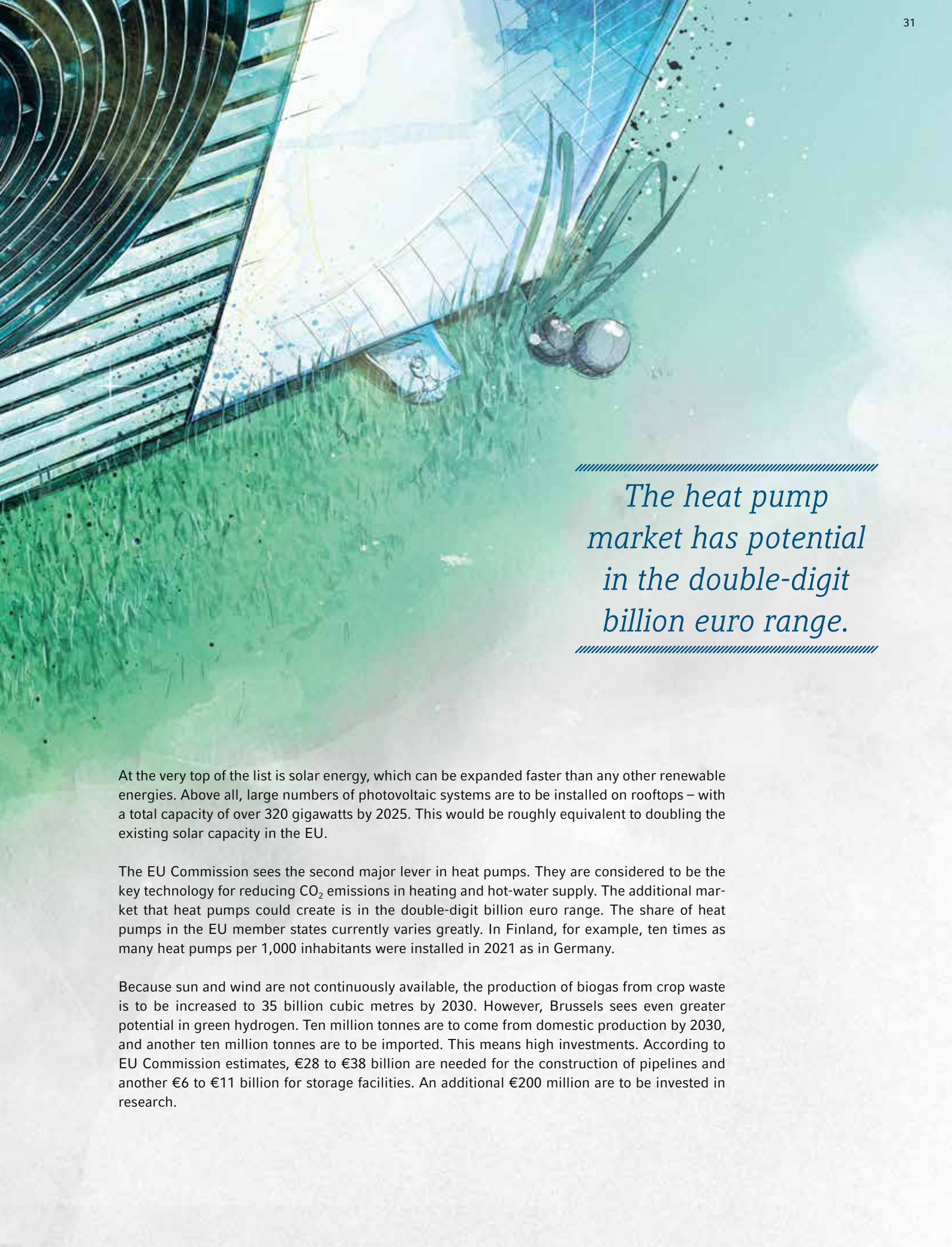
"This leads to a challenge: throughout Europe, thousands of additional installers must be qualified for this technology," explains EHI Secretary General Sabbati. Although the industry has massively expanded qualification opportunities, Brussels must also do its bit to promote the HVAC trade in particular. The Vaillant Group is already actively doing this on a broad front, with training programmes, service offers and simplification of installation. "What is important," says Sabbati, "is that the path taken is pursued with determination."

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*About three quarters
of all buildings in
the EU are to be
refurbished to
save energy.*
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Third, **quicker expansion of renewable energies**

While climate change has long been the only reason for the EU to boost renewables, the goal of energy independence is now being added to the list. "A huge acceleration and massive expansion of renewable energies in power generation, industry, buildings and transport," the EU commissioners propagate, "will push back the use of fossil fuels from Russia."



*The heat pump
market has potential
in the double-digit
billion euro range.*

At the very top of the list is solar energy, which can be expanded faster than any other renewable energies. Above all, large numbers of photovoltaic systems are to be installed on rooftops – with a total capacity of over 320 gigawatts by 2025. This would be roughly equivalent to doubling the existing solar capacity in the EU.

The EU Commission sees the second major lever in heat pumps. They are considered to be the key technology for reducing CO₂ emissions in heating and hot-water supply. The additional market that heat pumps could create is in the double-digit billion euro range. The share of heat pumps in the EU member states currently varies greatly. In Finland, for example, ten times as many heat pumps per 1,000 inhabitants were installed in 2021 as in Germany.

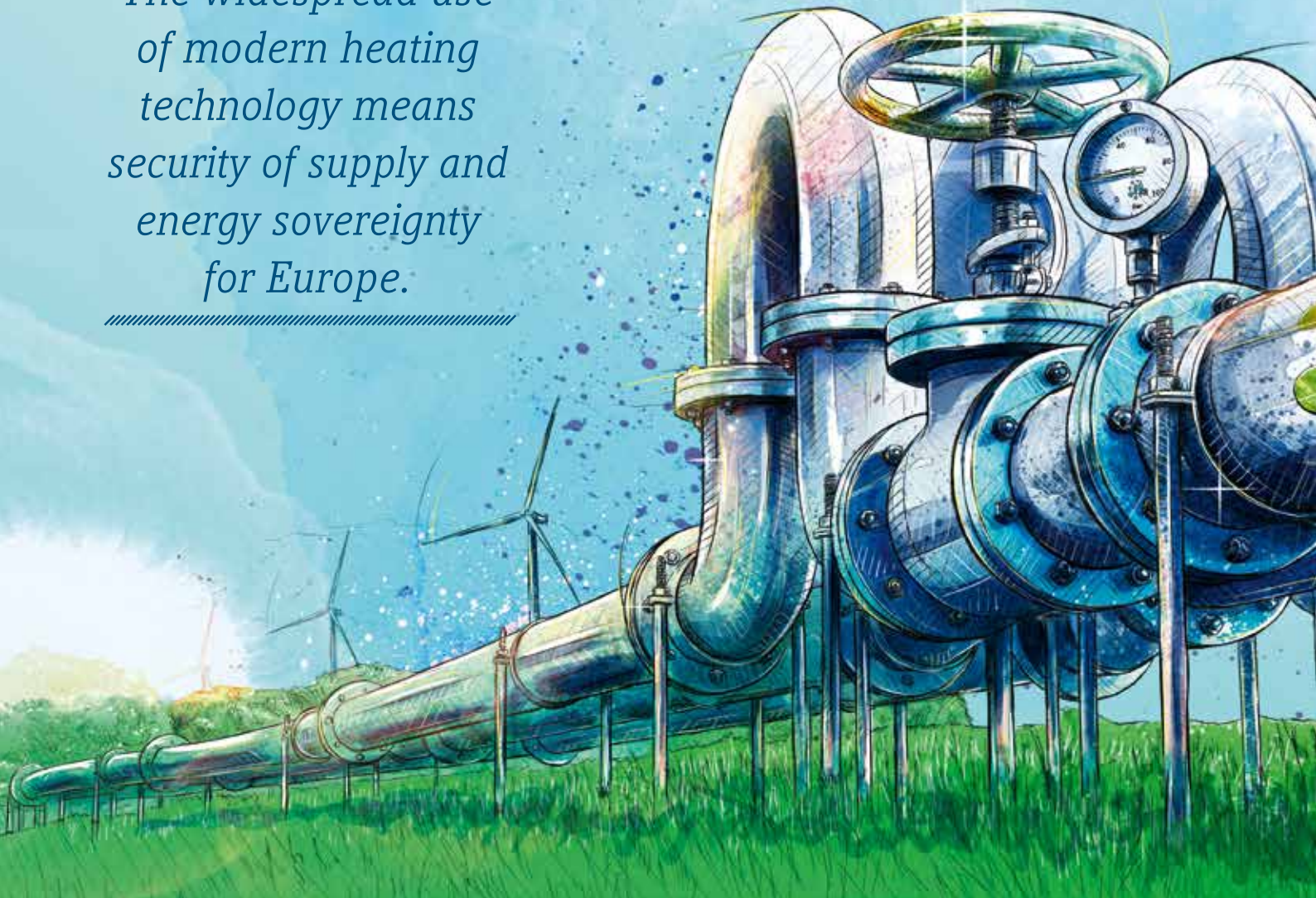
Because sun and wind are not continuously available, the production of biogas from crop waste is to be increased to 35 billion cubic metres by 2030. However, Brussels sees even greater potential in green hydrogen. Ten million tonnes are to come from domestic production by 2030, and another ten million tonnes are to be imported. This means high investments. According to EU Commission estimates, €28 to €38 billion are needed for the construction of pipelines and another €6 to €11 billion for storage facilities. An additional €200 million are to be invested in research.

Impacts on the heating sector

“In most countries of the EU, the heat pump will be the primary heating system of the future,” Karl-Heinz Backhaus, Head of Policy and Association Management at the Vaillant Group, is convinced, adding: “However, there will be an even greater variety of models and output classes than today to cover the full range of technical requirements and customer needs.” For this reason, the expansion of the product portfolio and manufacturing capacities, as well as the support of the HVAC trade, are core components of the Vaillant Group’s strategy.

EHI Secretary General Sabbati advocates the use of hybrid solutions where they are useful. Hybrids are a combination of a small heat pump with a condensing boiler as back up for peak loads. They are particularly suited for the renovation market; completely sufficient for showering and heating, hybrid solutions provide the needed flexibility to the electricity grid load which is expected as a result of increased electrification of the transport and building sector. “One thing is clear in any case,” she concludes: “The widespread use of modern heating technology makes a decisive contribution to security of supply and energy sovereignty within the EU.”

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*The widespread use
of modern heating
technology means
security of supply and
energy sovereignty
for Europe.*
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QUESTIONS FOR ...

Karl-Heinz Backhaus, Head of Policy and Association Management at the Vaillant Group

→ How will REPowerEU be implemented?

← It is a strategy paper of the EU Commission, from which legislation and policies will result. While the member states are supposed to implement energy savings quickly on their own initiative, other EU legislative projects are made more binding through regulations. We see that, for example, the Energy Efficiency Directive, the Ecodesign Directive or the EU Buildings Directive stipulate shorter-term and more ambitious targets. The expansion targets for renewable energies are already being ratified. You can sense how necessary it is not only to talk politically, but also to take action.

→ What do the REPowerEU plans mean for the European heating technology industry?

← Heat pumps are becoming the key technology. As a manufacturer, the Vaillant Group is already prepared for this. Heat pumps are technically at a high level and the increase in the required production capacities has been driven forward for years. The real challenge lies in the market. For the installer, the heat pump means much greater complexity, and it requires additional know-how and planning expertise. Without significantly increasing the capacities and the level of training in the HVAC trade, the targeted renovation quotas cannot be achieved. That is why the Vaillant Group actively supports installers with qualification offers as well as with planning and installation.

→ The EU Commission wants an additional ten million heat pumps to be installed by 2027. Is that feasible?

← If the political will is also reflected in corresponding favourable framework conditions, then yes. There are prerequisites that must be met. These include the long-term availability of subsidies, the qualification of the trades and the expansion of the electricity infrastructure. In addition, the price of electricity must remain within reasonable limits.

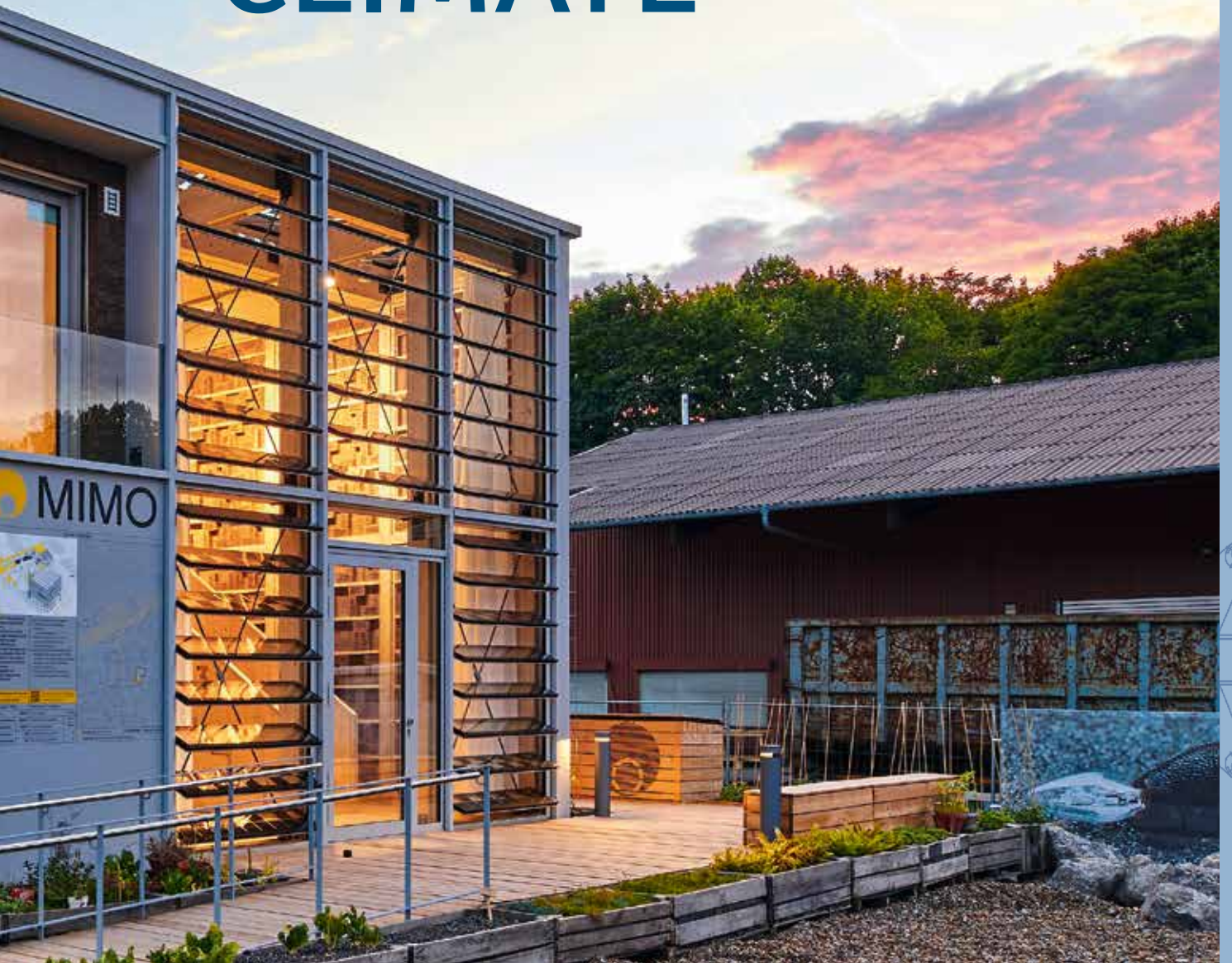
→ One component of REPowerEU is energy savings by consumers and in industry. What is the Vaillant Group's contribution?

← Since 2010, reducing energy consumption and increasing energy efficiency have been part of our climate strategy. We set ourselves transparent and verifiable targets such as halving our CO₂ emissions by 2030. This is achieved with the consistent use of electricity from renewable energy sources, efficiency measures in buildings and production and a switch to an electric vehicle fleet. And last but not least, we are making a contribution by providing the market with the heat pumps it needs.



SOLAR DECATHLON EUROPE

COMPETITION FOR A BETTER CLIMATE



At the Solar Decathlon Europe (SDE), university teams develop sustainable building concepts for urban living. The MIMO team from Düsseldorf was one of them.

It is the world's largest competition for sustainable building and living: the Solar Decathlon. University teams design buildings that conserve resources and are powered by renewable energy. The time needed for planning and development stretches over several years. At the close of the competition, each team builds a model house, known as a House Demonstration Unit (HDU). The houses are open to the public and are rated by a jury of experts.

COMPETITION OF INNOVATIONS FOR 20 YEARS

It was the US Department of Energy that founded the Solar Decathlon in 2002. Since 2008, the Solar Decathlon Europe (SDE) has been in place with the support of the non-profit Energy Endeavour Foundation (EEF) from the Netherlands. The Solar Decathlon Europe has so far been held in Spain (2010 and 2012), France (2014), Hungary (2019) and Germany (2022). The Solar Decathlon also takes place in China, Latin America, the Middle East, Africa and India.

Creative ideas for urban climate protection

The Solar Decathlon is held on several continents. In 2022, the fifth European version of the competition was organised – in Germany for the first time. And also for the first time, the focus was on sustainable building and living in the inner city. Under the motto “SDE goes urban!”, teams from eleven countries came up with solutions for closing vacant lots between buildings as well as renovating and extending or upgrading existing ones. In the summer of 2022, House Demonstration Units were constructed on the SDE campus in the city of Wuppertal. A variety of ideas were presented: Team Sweden 3D-printed cellulose-based wall and ceiling elements for their building – using a fully recyclable and renewable raw material that is a waste product of the Swedish timber industry. The team Deeply High from Istanbul and Lübeck utilised algae for natural wastewater treatment in its building. And the Lungs of the City team from Hungary focused on planting the roof and façade with greenery. Of course, the buildings of all teams are also climate-neutral.

Minimal Impact – Maximum Output

Climate-neutrality was also a central issue of concern for Team MIMO from Düsseldorf, which received sponsorship from the Vaillant Group. Under the theme “Minimal Impact – Maximum Output”, Team MIMO designed a concept for adding a storey to an existing building – Café Ada, an event venue in Wuppertal's Mirker Quarter. “Our guiding principle



In summer 2022, the House Demonstration Units were built on the SDE campus in Wuppertal.



was that only what adds value to the location and creates maximum benefit with minimal intervention should be done," explains Janina Schleuter, research assistant at Düsseldorf University of Applied Sciences and one of the project managers for Team MIMO. The elements of the concept: enlarging living spaces, adding more communal zones, urban gardening and an efficient energy management system.

For the construction of the house, the team mainly used adhesive-free wood. Prefabricated room modules made of solid wood were stacked on top of each other and dovetailed. Wood is used even in the bath-

room: the problem with conventional bathroom construction is that a lot of fungicides, included in elements such as the grouting, are used. Silicones are not very environmentally friendly either. Tiles are glued. You can't separate the building materials again and you can't recycle them. "That's how we came up with wood," says Liwia Gnoth, a student at Düsseldorf University of Applied Sciences and "de-cathlete" in Team MIMO.

MIMO decided that only local materials should be used to design the building. These had to have been produced under fair conditions and also be 100 per



VAILLANT GROUP SPONSORSHIP

The Vaillant Group supported Team MIMO of the Düsseldorf University of Applied Sciences as a main sponsor by providing the heating equipment. In addition, it provided technical advice on the energy concept and its implementation during the construction of the House Demonstration Unit on the SDE Campus in summer 2022. In addition to MIMO, two more national sales companies of the Vaillant Group sponsored teams: the Spanish team Azalea used systems from Saunier Duval in their project. The Hungarian team Lungs of the City also installed Saunier Duval technology. For the Vaillant Group, it was already the second Solar Decathlon: at the SDE 2019 in Hungary, the Vaillant Group was an active sponsor of the SOMEshine team from the three universities Pécs, Miskolc (both in Hungary) and Blida (Algeria).

cent compostable or reusable. The team opted for untreated cork for sound insulation between the living rooms, clay for interior plastering and clay blocks for thermal storage.

Natural building materials and modern technology

The entire building structure is surrounded by a climatic envelope consisting of horizontal movable lamellae. These not only provide air circulation. "The climate envelope has several functions. weather protection, and daylight input for the interior and the photovoltaic system in the slats, which generates electricity around the day because the lamellae are distributed around the entire building. In addition, we can tilt the slats so that we generate optimised electricity by tracking the sun," explains Eike Musall, Professor of Building Performance at the Düsseldorf University of Applied Sciences and one of the leading project heads of the MIMO team.

"Minimal Impact – Maximum Output" also applies to the operation of the house: the university team has integrated an efficient energy management system with intelligent heat distribution. The energiBUS system reduces the building's energy consumption by creating synergies: "All household appliances are interconnected. We heat with a brine/water heat pump and the residual heat from the household appliances is fed into the heating circuit," summarises Lena Frank. She is another project manager in the MIMO team and worked on the development of energiBUS4home as a research assistant at Düsseldorf University of Applied Sciences. Today she works as a system engineer with a focus on heat pumps at the Vaillant Group.

Not every residential compartment is fitted with its own household devices. The appliances are situated in a kind of "utility centre" and used communally. This ensures electricity savings. By coupling the household appliances with simultaneous use of waste heat and cooling energy, the heat pump can be operated even more efficiently. In order to realise this unique system solution, the Vaillant Group supported the system development in an advisory capacity and provided the required heat pump.



SAVING ENERGY IN THE HOME

Düsseldorf University of Applied Sciences has developed energiBUS4home, a system to reduce energy demand in buildings and households. Most energy is consumed for hot-water supply, heating and cooling the building. The system specifically creates synergies in the interaction of the individual components of household appliances and building technology. The MIMO team demonstrated the feasibility of the concept with their HDU.



The Vaillant Group provided Team MIMO with the required heat pump and assisted in an advisory capacity.





Fourth place – and a proud team

For the construction of the House Demonstration Unit in Wuppertal, Team MIMO had to complete their entire building concept on a predefined area of only 10 × 10 metres. The time for the construction was 14 days. “We were able to pre-build our residential modules to a large extent. This gave us a time advantage in the intense competition phase,” says Janina Schleuter. A water leak from the roof at the end of the construction phase almost set MIMO back, but thanks to the dry weather no damage occurred and the house could be opened on time.

The effort was definitely worth the trouble. Team MIMO was among the top finishers in several categories and received 775 out of a maximum possible 1,000 points. In the overall ranking, they placed fourth – with a small gap to the top-placed team RoofKIT from the University of Karlsruhe. Team MIMO’s house will now remain on the SDE Campus in Wuppertal for three years. It will support research into climate-neutral building and sustainable living in the city.





Our own
afforestation project

COSTA RICA

The SEEDS sustainability programme is moving forward with great strides: in Costa Rica, the Vaillant Group has begun its first forest project for CO₂ compensation.

Improving energy efficiency, using electricity from renewable sources and switching to electric mobility: with these steps, the Vaillant Group's CO₂ emissions will be cut in half by 2030 compared to the reference year 2018. Emissions that cannot be avoided have so far been offset by the purchase of CO₂ certificates from a certified afforestation project in Panama. In the long term, however, the company's own forests are to provide the CO₂ compensation. The Vaillant Group has now come a great deal closer to this goal: a new rainforest is going to grow on an area of more than 1,000 hectares in Costa Rica.

The Vaillant Group is investing in the large-scale afforestation project together with Munich Re. "With Munich Re, we have a strong partner at our side who thinks in the long term and brings a high level of climate and risk expertise to the table," says Claudia Altenrath, Head of Sustainability Management at the Vaillant Group, who is pleased about the new cooperation. TreeTrust, a subsidiary of the Munich Re Group, initiated and structured the project for CO₂ compensation. The project developer BaumInvest, which has been gaining experience with afforestation in Costa Rica since 2007, is responsible for the implementation on-site.

Audited CO₂ compensation

Over the next 40 years, the trees on the selected areas will absorb over 600,000 tonnes of CO₂ from the atmosphere. An intended side effect: the restoration of the near-natural rainforest will contribute to the preservation of biodiversity in Costa Rica, create new habitats for endangered animal species and generate job opportunities with fair wages for people in a rural region with economic challenges. In this way, the climate protection project also helps to foster sustainable development in Costa Rica. The afforestation activities are certified according to the internationally recognised Gold Standard for the Global Goals. This standard demands that climate protection projects not only make a lasting contribution to reducing emissions, but also demonstrably promote at least three of the 17 declared United Nations Sustainable Development Goals.

In five years, accredited Gold Standard auditors will check how much emissions the plants bind and whether the sustainability targets are met. Only after verification will the Vaillant Group be





The seed of the tree is planted with a seed mix of companion plants.



The tropical, humid climate is ideal for forest development.

able to use its own compensation certificates for the first time. New certificates will be issued every five years, with the amount of carbon dioxide bound increasing gradually as the trees continue to grow.

Costa Rica: from climate sinner to role model

Claudia Altenrath explains why Costa Rica is the ideal host country for the current Vaillant compensation project: "The tropical, humid climate there is ideal for forest development. The trees do not lay dormant for the winter, but grow all year round. In the process, they constantly absorb and capture CO₂. In addition, Costa Rica is a pioneer in nature conservation and reforestation." This is evidenced by 15 national parks and 40 biodiversity corridors. Almost 30 per cent of the country's land area is under environmental protection. This was not always the case: at the end of the 1980s, deforestation and logging had progressed so far that only a good 20 per cent of Costa Rica's land was still covered by forest. Then came the turnaround. Mass deforestation – legal or illegal – has now become a thing of the past. Moreover, the population supports the renaturation projects. The advanced education system of the Central American country also plays an important role in this. Children are already taught in school about climate protection and sustainability.

Veni, vidi, plantavi

In July last year, Claudia Altenrath was able to see the progress of the Vaillant Group's latest climate protection project for herself. Together with representatives of Munich Re, TreeTrust and BaumIn-

**A new rainforest is
being grown on more
than 1,000 hectares
in Costa Rica.**



24 different tree species provide biodiversity.

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The planting of the natural forest has now been completed.

>

vest, she travelled to Costa Rica to inspect the areas and even lent a hand with the planting.

The plots of land for the project are located in a remote region in the north of Costa Rica. The rain-forest that once grew there was previously cleared for livestock farming. Some of the depleted pastures had been lying uncultivated for some time. The Caño Negro site, Los Chiles, is located in a flat and widespread area close to the border with Nicaragua. It is on one of the largest water reserves in Central America and home to countless

bird species. A few hours' drive south lies the Guatuso region; here, too, new forest is being planted as part of the project. It is located in the immediate vicinity of the national park around the Tenorio volcano. In contrast to Caño Negro, the landscape here is very hilly. It is no coincidence that reforestation is taking place on the edge of these nature reserves. The sites were specifically chosen to expand existing biodiversity corridors. In a few years, new habitats for native plant and animal species will be created there, including jaguars, capuchin monkeys, tapirs and many birds.



Project plots are located in a remote region in the north of Costa Rica.

From seed to tree

Meanwhile, the planting in Caño Negro and Guatuso has been completed. A natural forest of predominantly native tree species is now being grown on the project lands, which will manage without pesticides and work against climate change. This is made possible by an innovative afforestation concept, explains Antje Virkus from the project developer BaumInvest: "We plant up to 24 different types of trees in various arrangements, which each differ in terms of growth rate, carbon storage capacity

and lifespan. In addition, supporting vegetation is planted to protect the seedling or sapling." Specifically, it will work like this: a seedling or seed of the tree is put in the ground together with a seed mix consisting of annual or perennial companion plants such as ground cover and black beans. The companion vegetation protects the young trees from the sun, ant infestation and wildfire, and pushes back invasive grasses. It also helps to retain moisture in the soil and, after withering, provides the soil with nitrogen – with natural fertiliser. Under the eyes of the forest conservationists in charge of the project,

the trees gradually grow into a near-natural mixed forest. Intensive care is necessary during the first five years: overgrown grass is removed, dead trees are replanted. "After this period, we deliberately refrain from any significant interventions. The forest is left to grow naturally. At measuring stations set up as part of the certification process, we monitor the development of the trees and their CO₂ storage," says Antje Virkus. At the end of the project period, the forest will be registered in the state nature conservation programme. This will place it under permanent protection.



The young trees need intensive care for about five years after planting.

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In July 2022, the project partners were at the afforestation site for the planting campaign.

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In the end, the forest will be placed under permanent protection.

Gradual reduction of purchased CO₂ certificates

"By 2030 at the latest, we will fully cover our CO₂ compensation needs with our own projects. Gradually, we will reduce the number of CO₂ certificates purchased from the Tropical Mix project in Panama," says Claudia Altenrath with regard to the Vaillant Group's plans. In future, the project in Costa Rica will account for about half of the Vaillant Group's offset requirement. Another project in South America is already being conceived.



Caño Negro, Los Chiles

The site is located in a flat and widespread area close to the border with Nicaragua.

COSTA RICA

MODERNISING WITH HEAT PUMPS

- PAPANBURG -



- MARIENMÜNSTER -



- BINZEN -

Can't do it?

Yes, you! can!

Climate change and energy supply are pushing the heat pump business to a new level – also in the building stock.



 **Vaillant**

Heat pumps in the most difficult renovation properties – all the way from stock buildings from the 1990s to old and heritage-protected houses. Vaillant Germany and installers are tackling the Heat Pump Challenge.

In the north of Emsland, in Lower Saxony, lies the small town of Papenburg. Very close to the southernmost seaport and the oldest moorland colony in Germany, one can find the almost century-old clinker brick house of the Klee family. A slate plaque with the words "Welcome home" is hanging next to the entrance door. There is a slide for the children in the garden.

Not too long ago, the 180-square-metre family home from 1924 consumed around 34,000 kilowatt hours of gas per year. Professional installer Thorsten Hackmann from Papenburg recognised the energy-saving potential of the old building and applied for the Vaillant Heat Pump Challenge with his HVAC company. "For me, it's the first time ... in a renovation project," says Thorsten Hackmann with a smile.

Revolution in the utility room

Hundreds of thousands of houses like the Klee family's are still standing in Germa-

ny – with old heating systems and poor insulation standards. In times of climate change, such properties are no longer sustainable. The whole of Europe wants to move away from oil and gas, towards sustainable solid fuels, but above all towards heat pumps. In Germany, the political focus is on building renovation with heat pump technology. The demand for heat pumps is already very high and will continue to increase.



This is enormously increasing both the opportunities and challenges for the heating industry. HVAC companies can hardly keep up with the customer demand for heat pumps: in 2021, well over one million heat pumps were sold across Europe – an increase of approximately 45 per cent compared to the previous year and a trend that accelerated even further in 2022. However, many HVAC contractors have yet to familiarise themselves with heat pump technology – in both new construction and renovation. And there are many properties: in Europe, it is estimated that there are over 120 million residential buildings.

Heat pumps are wanted

"I understand every tradesperson who says: the reliability I have built up with classic heating appliances is gone for the time being with heat pumps. Here I have to learn again," says Rainer Haase from heat pump production at the Vaillant Group. He gives the following recommendation: "It helps to exchange



- PAPENBURG -

Not long ago, the 180-square-metre family home built in 1924 used around 34,000 kilowatt hours of gas per year.



ideas with colleagues who have already gained experience with heat pumps.”

In order to encourage and convince more HVAC businesses to install climate-friendly heat pumps, Vaillant initiated a Heat Pump Challenge under the motto “Can’t do it? Yes, you can!”. For the challenge, properties were sought for which heat pumps would appear not to be a viable option at first glance. Installer partners were asked to suggest renovation projects in their region that were as difficult as possible, so that they could then tackle them technically together with the expertise of Vaillant. In total, there were around 70 renovation projects proposed – three of which were then selected. Obstacles such as historic preservation, lack of underfloor heating or poor exterior insulation made the use of a heat pump considerably more difficult here – but this did not at all mean that the undertaking was impossible.

Back to the future of heating

Thorsten Hackmann’s team is already gathering in front of the clinker brick house in Papenburg. “As a heating engineer, I approached this with a certain amount of scepticism. I wasn’t convinced about the implementation for a long time. But we want to do something for the climate. Now my boys and I are looking forward to the project,” explains Thorsten Hackmann. Many skilled HVAC craftsmen and women do not dare to attempt installing a heat pump in an old building from 1924: a house like that without large heating surfaces such as underfloor heating and without an insulated exterior façade does not offer optimal conditions – and for Thorsten Hack-

mann it is also the first heat pump in a renovation project. In the basement of the detached house, the old gas-fired condensing boiler is removed. Instead, the hydraulic unit of the heat pump, including the storage tank, is located here. The outdoor unit of the aroTHERM plus air/water heat pump is installed against the wall of the house. The already-insulated upper-storey ceiling and the installation of new windows had already significantly improved the energy efficiency.

But a final touch is needed: seven-centimetre-thick mineral fibre blow-in insulation in the hollow layer of the masonry provides additional insulation to the outer walls. In addition, all the radiators are replaced with more powerful models. With all these measures, the skilled HVAC craftspeople achieve a pleasant room temperature and sufficient hot-water supply for the entire house – with an efficiently operating and energy-saving heat pump.

The sun doesn’t charge money

The second property in the challenge is a prime example of the difficulties in residential properties from the 1990s. HVAC specialist Axel Schröder from Vlotho and the homeowner want to convert the house in Marienmünster in North Rhine-Westphalia to a sustainable energy supply. The energy consumption still averages 38,000 kilowatt hours of gas per year. This is why the old gas-fired heating system in the 350-square-metre two-family house is being replaced with a cascade of two aroTHERM plus air/water heat pumps. For additional energy and self-sufficiency in terms of energy, a large



photovoltaic system on the roof of the house will provide electricity for the heat pumps. An additional battery storage unit is also part of the plan. "We want to reduce the primary energy demand as much as possible while using as much renewable energy as we can. Because the sun doesn't charge money," Axel Schröder explains, pointing his finger upwards. The windows are already triple-glazed and the roof insulated. All two-layer radiators in the house are being replaced with three-layer ones to increase the transfer surface by 30 per cent. Axel Schröder calculates that the house will now probably consume 8,000 to 9,000 kilowatt hours of electricity per year. At the same time, thanks to the large photovoltaic system on the roof for the house's own electricity consumption, the amount of electricity drawn from the grid will be significantly lower in the future.



Clever heating under heritage protection

The third property, in Binzen in southern Baden, is truly historic. A modern loft living space has been created in the heritage-listed former community centre dating from 1907. The 180-square-metre house impresses with a ceiling height of three and a half metres. But due to its heritage-protected building shell and floor, the beautiful historic building has a gas consumption of almost 40,000 kilowatt hours per year. "It looks great, but thermally it's a complete disaster," says Stephan Ziegler, the specialist HVAC craftsman in charge of the refurbishment project. "Hence we were delighted when we found out that we could take part in the Heat Pump Challenge. Above all, we didn't expect that it would really work with this property. My old teacher always

- MARIENMÜNSTER -

An HVAC specialist and the homeowner want to convert the house in Marienmünster in North Rhine-Westphalia to a sustainable energy supply.





– BINZEN –

The base load of the building is to be covered by an aroTHERM plus heat pump.
A gas-fired condensing boiler helps out with peak loads.

said that heat pumps were only suitable for new buildings.”

Ceiling instead of underfloor heating

Although some of the radiators had been renovated already, the flow temperatures could not be lowered enough to heat the house efficiently with a pure heat pump solution. The craftsman therefore opts for installing a dual solution consisting of a heat pump and a gas-fired heater. The base load of the building is to be covered by an aroTHERM plus heat pump. When peak loads occur during the cold days of winter, an addi-

tional gas-fired condensing boiler will kick in for support. Energy-efficient heat distribution is not possible with the existing radiators. In order to be able to heat the building properly at a lower flow temperature, the decision is made to install large-area ceiling heaters. According to current calculations, this will probably reduce gas consumption to 8,000 kilowatt hours and electricity consumption to 7,500 kilowatt hours per year.

Back at Thorsten Hackmann’s in northern Papenburg: the HVAC professional is now convinced by the heat pump that is installed in the refurbished property. “I’m very happy that the system is now

up and running here. My personal watershed moment was the final commissioning. The radiators are getting warm. The system fits.” The team expects the house to consume 14,000 kilowatt hours per year in the future. Around 7,500 of that will be used for the heat pump.

After one year at the latest, the HVAC specialists and Vaillant Germany will visit Papenburg, Marienmünster and Binzen again to check the performance of the heat pumps and the actual electricity consumption. This will then be the final seal of approval:

Can’t do it? Yes, you can!

Can’t do it? Yes, you can! Vaillant Heat Pump Challenge

Almost 70 renovation projects were submitted by HVAC professionals throughout Germany. Three of the projects were selected.

- A jury comprised of industry insiders and heat pump experts from Vaillant Germany made a joint selection from the project submissions.
- The refurbishment and the installation of the heat pumps in the selected properties were documented from start to finish, with corresponding pictures and videos published. The campaign generated a reach of around 4.5 million views on the social media channels of Vaillant Germany.

- Heating and air conditioning trade influencers and communities picked up on “Can’t do it? Yes, you can!” and posted about the renovation projects on their channels.
- The HVAC trade press reported on the campaign more than 120 times in total, thus generating further visibility among trade professionals.
- After completion of “Can’t do it? Yes, you can!”, Vaillant Germany will document all the information about the buildings and the execution of the refurbishments on a special website.





MINI HEAT PUMP FOR APARTMENTS

Heating must become greener. First and foremost to protect the climate. But the switch to renewable energies also guarantees security of supply.



Heat pumps are set to become the gamechanger of the energy transition. Demand has been rising for years. The recent massive increase in energy prices has triggered a genuine boom. As pleasing as the great interest in environmentally friendly heating technology may be, it comes with clear challenges. That makes it all the more important to think in terms of solutions.

In order to bring heat pumps into as many buildings as possible, product development must be intensively pushed forward. Up to now, the market for heat pumps has been heavily concentrated on new buildings and the segment of detached and semi-detached houses. In the case of renovations, a shift to heat pumps is still rarely being considered – on the one hand, because conventional heating technology was economically more attractive for a long time. On the other hand, because there is a lack of practicable solutions in certain areas of application. An example of this is the replacement of traditional heating appliances on storeys of multi-family houses.

In view of the climate targets, it is inevitable that existing buildings will come under increased scrutiny. Initiatives that demonstrate the potential of heat pumps as best-practice examples are therefore more important than ever: an Austrian reference project, in which a decentralised mini heat pump solution is used directly in the individual flats for the first time, illustrates what a modern, sustainable heating concept for existing buildings could look like.



SEARCHING FOR AND FINDING SOLUTIONS

In spring 2022, the Austrian housing company Alpenländische Gemeinnützige WohnbauGmbH started the general refurbishment of a residential building on Fenerstraße, Innsbruck. The goal: a full energetic upgrade – including façade renovation and window replacement – and a departure from the use of fossil fuels.

An environmentally friendly alternative had to be found for the 48 apartments, in which individual single-floor heaters and heating stoves originally provided heat. Both CO₂ emissions and energy costs were to be reduced. Moreover, the project had to be realisable while the residents were still living in the apartments. The energy consulting company EN-CON, Energy Consultants GmbH, was commissioned with the planning. “The goal was to convert the old building to renewable energies. Having long relied on semi-centralised, cascaded heat pump systems in new buildings, we wanted to test this type of system in refurbishments as well. We decided for the first time to use mini heat pumps installed directly in the residential units.” Vaillant Austria was on board as a project partner: on the one hand, because the geoTHERM mini heat pump provided a suitable technical solution. On the other hand, the team from Vaillant Austria brought a lot of heat pump know-how and enthusiasm to the project.



< The Vaillant aroCOLLECT heat pump outdoor unit at the time of installation work



Vaillant Austria contributes know-how to the Fennerstraße refurbishment project.

ECONOMICAL DUAL SOLUTION

The selected Vaillant mini heat pumps were installed directly in the individual flats of the apartment building – despite their being equipped with radiators. The wall-mounted units hardly differ in appearance from gas heaters and they are quiet when in operation. An additional water heater provides the desired domestic hot-water convenience.

In the residential building on Fennerstraße, a larger-sized central heat pump is installed as a supplement to the heat pumps on each floor. From the roof where it is located, it supplies a constant temperature of 20 degrees Celsius for the heating circuit. The energy is fed directly into the flats on the individual floors via a circulation system. In the apartments, the mini heat pumps raise the temperatures further so that they are sufficiently high for heating. The energy balance of the building is impressive thanks to the system solution. In total, the thermal refurbishment will result in energy savings of up to 80 per cent. The higher investment in energy-saving heating technology also means that the residential building in Fennerstraße exceeds all decarbonisation targets in the building sector.

The environmentalisation of the heating market is a driver for the energy transition. For heat pumps to continue to gain acceptance in existing buildings, national energy and climate policy plans, targeted subsidies, but also new technical solutions are needed where these are still not available. "Above all, the real estate and construction industry faces the great challenge of finding adequate solutions for the switch to renewable energies," sums up Josef Kurzman, Sales Manager for the project business at Vaillant Austria. "The mini heat pump definitely represents an interesting alternative for the future as a compact, decentralised hot-water heating system – especially for multi-storey buildings." The Fennerstraße reference project shows just how much potential there is in the technology: mini heat pumps as another climate-friendly option for the renovation of older buildings.



The project partners demonstrate the potential of mini heat pumps.



TEST RUN IN THE HYDROGEN VILLAGE

100%

HYDROGEN

A REAL-LIFE CHECK

The Vaillant Group supplies the heating appliances for the hydrogen projects H₂-Infra and H2Direkt. In both projects, 100 per cent hydrogen is used in its pure form.



The Vaillant Group supplies hydrogen heaters for several field tests in Germany.

Following Vaillant UK's first hydrogen field tests, Vaillant Germany is now catching up. In the Bitterfeld-Wolfen chemical park in the eastern German state of Saxony-Anhalt, the local grid operator MITNETZ GAS is running the H₂-Infra pilot project. The focus is on technology for household and commercial applications. Work is being done on the standardisation of processes and on operating efficiency, as well as on the further development of training programmes and occupational health and safety concepts for the application of hydrogen technology. Vaillant Germany is involved in the project as a technology partner and is providing a condensing boiler for test operation that runs 100 per cent on hydrogen. Dirk Sattur, Technical Managing Director of MITNETZ GAS, is convinced that a switch to hydrogen can only be successful with joint efforts: "As a regional gas distribution grid operator, we have the necessary know-how to be able to set up a hydrogen infrastructure on-site relatively quickly. How-

ever, the necessary conditions must also be created on the installation and customer side, and this requires cooperation with strong partners and the municipalities."

100% hydrogen in stand-alone operation

In late autumn of 2023, Vaillant Germany will get started with H2Direkt. This second pilot project, which is being spearheaded by the utility Thüga and the grid operator Energie Südbayern (ESB), is the first to date in Germany in which an existing natural gas grid is being converted to 100 per cent hydrogen in stand-alone operation. Hohenwart in Upper Bavaria was chosen as the location for the field test. There, a total of ten households and a gardening nursery are to be disconnected from the local natural gas grid for 18 months. They will be supplied with 100 per cent green hydrogen for space heating and hot water. The electricity to produce the hydrogen is generated from a wind turbine and a photovoltaic system in the neighbourhood. Preparations are currently underway for



the installation of the Vaillant hydrogen-condensing boilers. The test phase will begin with the next heating period.

H2Direkt is intended to show that green hydrogen is an alternative to fossil natural gas. Alexander Schuh, who is responsible for the hydrogen business at Vaillant Germany, explains why the technical transition is quite simple: "The principle of a gas-fired heater is always the same – regardless of whether conventional natural gas or hydrogen is used for it. Only some components, such as the fan or heat exchanger, have to be adapted to the somewhat different physical properties of hydrogen." It is precisely this relative ease of conversion that the project team sees as the main argument why hydrogen could be considered for heat supply in the course of decarbonisation: because the opportunity to use the existing gas grid infrastructure and the planned plug-and-play appliance solutions make the switch to climate-friendly hydrogen easy and affordable for households. "With the existing gas infrastructure, we have very good assets for also supplying and heating buildings and homes with hydrogen,"



says Michael Riechel, Chairman of the Board of Thüga Aktiengesellschaft. "In municipal heat planning, the use of hydrogen should therefore not be limited to individual sectors. As an implementation partner on-site, we want to use synergies between the sectors and open up all the possibilities for our customers to significantly save CO₂ with a broad range of energies."

Costs decide

How soon the developments around the green hydrogen economy will progress is ultimately a question of money. It is still expensive to produce hydrogen. By 2030, however, production costs could fall to the point where hydrogen becomes available on the market. The massive increase in natural gas prices in 2022 further improves the competitiveness of green hydrogen. In addition, the CO₂ price on fossil fuels could give a boost to investments in environmentally friendly energy sources and in the production of green hydrogen.



"As a regional gas distribution grid operator, we have the necessary know-how to be able to set up a hydrogen infrastructure on-site relatively quickly."

Dirk Sattur,
Technical Managing Director of MITNETZ GAS



Vaillant



