FOR A BETTER WORLD

Sustainability Journey: 2023 Highlights

KNAUF INSULATION

CONTENTS

3.

INTRODUCTION

7.

PUT PEOPLE FIRST

13.

ACHIEVE ZERO CARBON

16.

DELIVER A CIRCULAR ECONOMY

20.

CREATE BETTER BUILDINGS

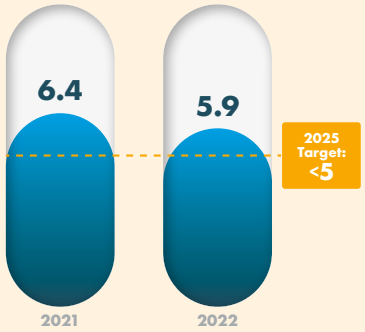
COVER IMAGE: Casa Sophia is certified Passivhaus Premium and has been awarded the highest 'five-leaf' level of certification by the Spanish Green Building Council. Knauf and Knauf Insulation solutions were used extensively in the construction by **100x100 Biopasiva**. For more details see page 23.

OUR SUSTAINABILITY HIGHLIGHTS

PUT PEOPLE FIRST

Ensure zero harm

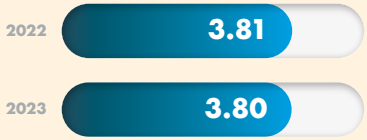
Total Recordable Incident Rate (TRIR)
All regions worldwide



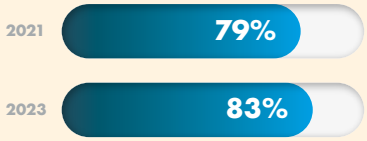
8% DECREASE

Have the most engaged employees

Engagement score (out of 5)



Response rate



8.4% INCREASE OF PARTICIPANTS

ACHIEVE ZERO CARBON

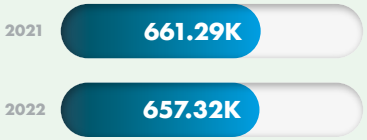
Deliver net zero embodied carbon solutions

2025 TARGET: ACHIEVE A 15% DECREASE

Absolute full scope (Mton CO_2e)

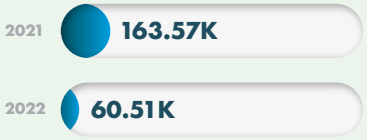
8.2% DECREASE

Scope 1 ($MtonCO_2e$)



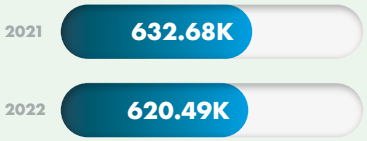
0.6% DECREASE

Scope 2 ($MtonCO_2e$)



63% DECREASE

Scope 3 ($MtonCO_2e$)

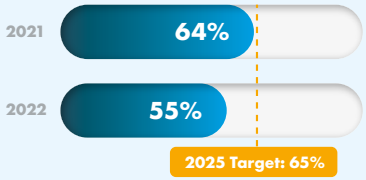


1.9% DECREASE

DELIVER A CIRCULAR ECONOMY

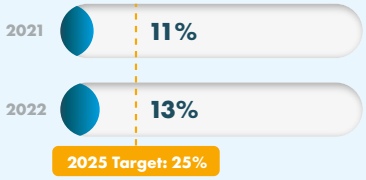
Increase recycled content in our batch

Glass Mineral Wool



9% DECREASE

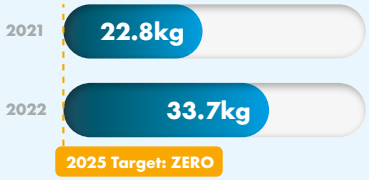
Rock Mineral Wool



2% INCREASE

Send zero waste to landfill

(kg waste/tonne of net nominal output)



47.8% INCREASE

Reduce fresh water use in our plants

(m3/tonne of net nominal output)

14% DECREASE

These figures relate to Knauf Insulation, part of the Knauf Group, and are based on the data for Europe, Middle East and Asia (EMEA & APAC) from 2021-2022 and activities from 2022 and 2023, unless specified otherwise. For accuracy we may amend previous figures.

JOURNEY OF CONTINUOUS IMPROVEMENT

Sustainability defines every aspect of Knauf Insulation. Our solutions make buildings more energy efficient, reduce emissions and provide comfort for building users.

At the heart of every Knauf Insulation site, is our For A Better World sustainability strategy which commits us to Put People First, Achieve Zero Carbon, Deliver A Circular Economy and Create Better Buildings.

PUT PEOPLE FIRST

ACHIEVE ZERO CARBON

DELIVER A CIRCULAR ECONOMY

CREATE BETTER BUILDINGS

So, how are we doing?

Inevitably, we are set to achieve some targets and for others there is room for improvement.

For example, we have set a goal to reduce the embodied carbon of our solutions by 15% by 2025 compared to our 2021 baseline and we are on track to achieve this. From 2021 to 2022 we reduced our emissions by 8.2%.

In terms of Putting Our People First, we saw solid results and a record 83% response rate for our 2023 engagement survey, while our Total Recordable Incident Rate worldwide fell from 9.1 in our 2019 baseline year to 5.9 in 2022.

Our Diversity and Inclusion initiatives have also proven to be effective and are positively impacting our approach to leadership, hiring processes and the way we communicate with each other.

Meanwhile, our Public Affairs teams have carried out great work to keep energy efficiency at the top of policymakers' agendas. Knauf Energy Solutions continued to demonstrate the importance of mass renovation and real performance when it comes to energy efficiency in buildings.

Of course, there were areas where we need to improve. For example, we recognise that when it comes to sending zero production waste to landfill there is work to be done. However, there are positive developments that give reason to be optimistic such as our Wood Wool division that sent zero waste to landfill in 2022.

Ultimately, this report is a reminder that sustainability is not a destination but a journey, and at Knauf Insulation this is a journey of continuous improvement.

Dominique Bossan | Knauf Insulation CEO for Europe, Middle East and Asia, Member of the Knauf Group Management Committee

CULTURE CHANGE DRIVES SUSTAINABILITY TRANSITION

Marc Bosmans is our Group Sustainability Director responsible for delivering Knauf Insulation's sustainability transition with Group Chief Operating Officer David Ducarme. Our sustainability targets, progress and management of risks and opportunities continuously play a key role at Board level to drive the company's success.

In what ways has Knauf Insulation improved its approach to sustainability?

We have appointed Regional Sustainability Managers to implement region-specific projects, engage with our teams and support customers' requests for sustainability data.

We have also introduced Sustainability Engineers at our plants to prioritise site efficiencies and optimisation, share best practice as well as deliver accurate data to a central platform to track progress.

We now share this data every quarter with the Knauf Insulation Board to ensure informed business decisions reflect our sustainability commitments.

Crucially, we are also investing in the sustainability literacy of our colleagues through newsletters, update moments, information sessions and collaborative workshops such as Climate Fresk (see page 6).

We communicate about sustainability in general and about our progress to everyone in the company, to show how they can contribute to our transition and improve efficiency.

We ensure constant internal communication about projects' progress and work collaboratively across a wide range of teams. These initiatives are essential to engage people and inspire change.

How does Knauf Insulation reconcile intensive growth as a company with cutting emissions?

We set a 2025 target to cut the embodied carbon of our products by 15% and aligned with the Knauf Group's ambition to reduce CO_2 by 50% in absolute values by 2032.

These are ambitious goals that require significant innovation, commitment and investment as well as contributions from every employee in the company.

From 2021 to 2022 we reduced scope 1 emissions generated from our sites by 0.6%, cut scope 2 emissions by 63% and scope 3 emissions by 1.9%.

We continue to put every aspect of our operations under the microscope: from ensuring low-carbon recycled materials for our batch and securing renewable energy supplies to installing cleaner manufacturing technology, increasing energy efficiency and reducing the carbon footprint of our transportation and packaging.

Continues on page 6 >

CULTURE CHANGE DRIVES TRANSITION *(continued)*

Where is the company in terms of delivering a circular economy?

We have built our first RESULATION plant at our Visé site in Belgium which is successfully recycling production off-cuts from our sites as well as Mineral Wool scrap from customers' construction sites and transforming this material into new Knauf Insulation solutions.

We have also seen success in our Wood Wool division which has been sending zero waste to landfill since 2022.

However, unfortunately, we saw production waste to landfill increase from 2021 to 2022. So, with the support of our Sustanability Managers and Sustainability Engineers, every plant is exploring new ways to improve our recycling processes as well as finding innovative partnerships to reuse waste and implement efficiencies.

What is Knauf Insulation doing to tackle the challenges of climate change?

Buildings are responsible for 40% of Europe's energy use and 36% of its emissions. Since Russia's invasion of Ukraine, energy prices and energy poverty have increased and energy security as well as climate ambitions have become even more important as priorities.

Knauf Insulation solutions make a major contribution to saving energy, curbing emissions and strengthening energy security. Our products also meet stringent energy efficiency regulation.

As a result, demand for our products is increasing. That is why we are focused on geographical expansion – acquiring new sites, building new plants and introducing the latest energy efficient technology – to meet demand.

Our Public Affairs teams are also constantly campaigning to put building energy efficiency, increased renovation rates and deep retrofits at the core of national and international policies.

What are the next steps towards Knauf Insulation's sustainability transition?

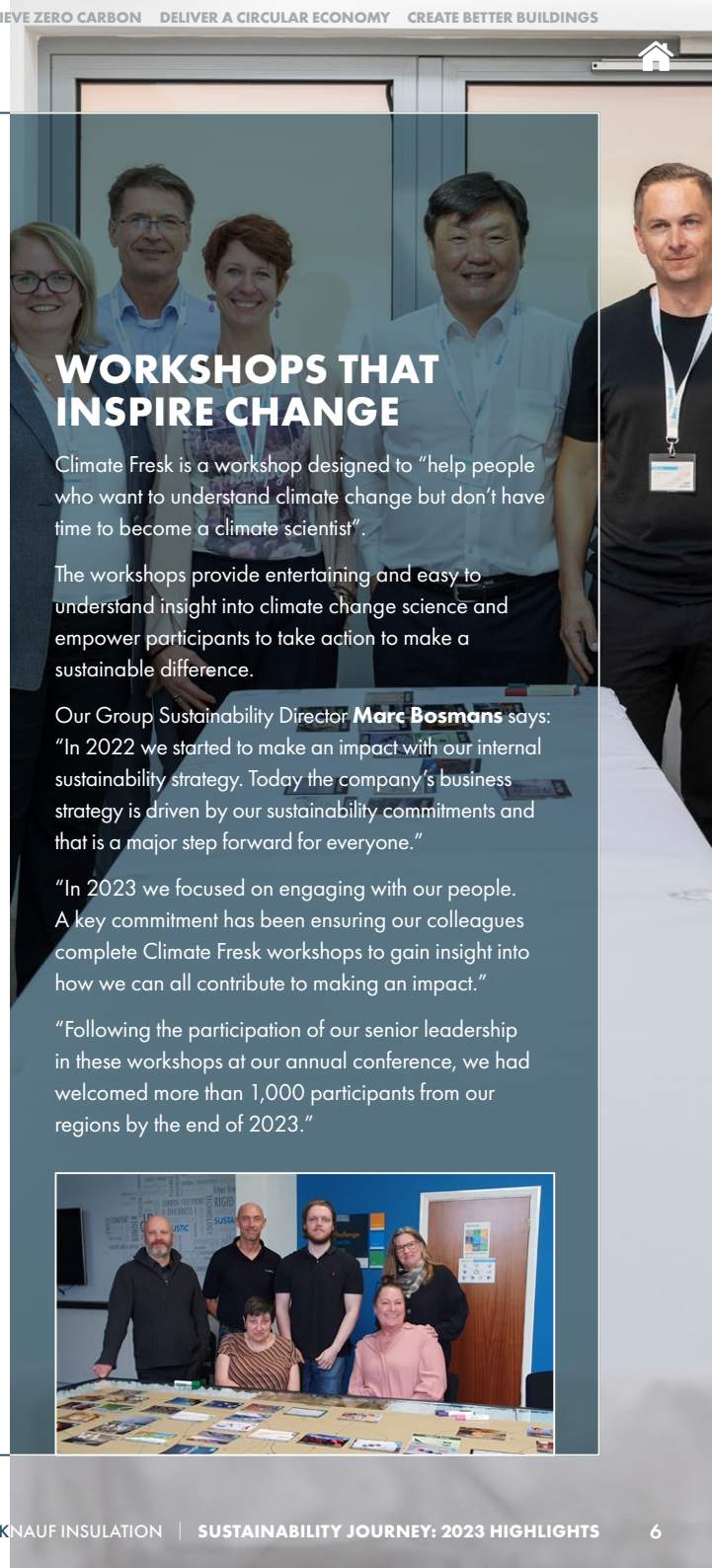
By engaging our colleagues and involving them in every step of our sustainability journey, we aim to leverage opportunities in every area and function of the company where we can make a difference – from energy efficiency and our transition to renewables to reducing water use and waste.

In addition, we want to continue making a positive impact on the communities around us. We want to create better buildings by continuously campaigning for more effective energy efficiency regulation. Equally important, we want to build on our work to drive greater awareness of sustainability both inside and outside our company. Sustainability requires the commitment of everyone all the time.

As a manufacturer our ambition is simple: we need to produce our solutions using the highest possible energy efficiency and by emitting the lowest possible emissions.

Inevitably, technology holds the key to our future success. That is why we are investing significantly in being technologically ready and driving an agile strategy that will enable the company to navigate an effective pathway to low-carbon production.

David Ducarme
Knauf Insulation Group Chief Operating Officer and Deputy CEO



WORKSHOPS THAT INSPIRE CHANGE

Climate Fresk is a workshop designed to "help people who want to understand climate change but don't have time to become a climate scientist".

The workshops provide entertaining and easy to understand insight into climate change science and empower participants to take action to make a sustainable difference.

Our Group Sustainability Director **Marc Bosmans** says: "In 2022 we started to make an impact with our internal sustainability strategy. Today the company's business strategy is driven by our sustainability commitments and that is a major step forward for everyone."

"In 2023 we focused on engaging with our people. A key commitment has been ensuring our colleagues complete Climate Fresk workshops to gain insight into how we can all contribute to making an impact."

"Following the participation of our senior leadership in these workshops at our annual conference, we had welcomed more than 1,000 participants from our regions by the end of 2023."

SAFETY FIRST

COMMITMENT

WE ARE COMMITTED TO ZERO HARM

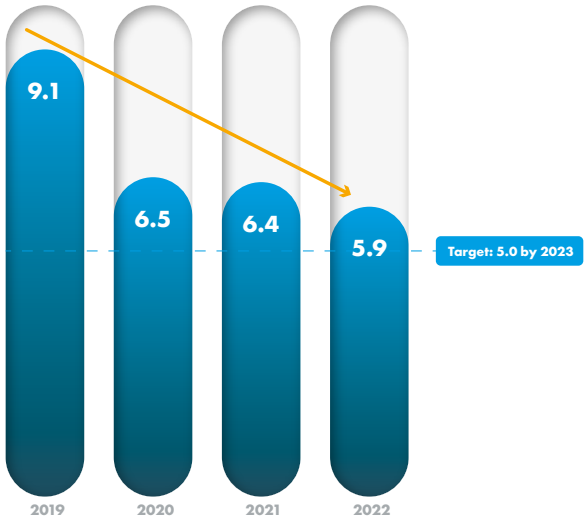
2025 TARGET

A maximum Total Recordable Incident Rate (TRIR) of 5.0 by 2023 (fast-tracked from 2025) compared to our 2019 baseline of 9.1.

STATUS: ON TRACK

TRIR Year-To-Date

All regions worldwide



Mark Thompson, Knauf Insulation's Health, Safety, Environment, Energy and Quality Systems Director for EMEA & APAC, says: "Our safety performance year on year has improved over the last 11 years, but we can't rest on our laurels. We can only continue to drive our ultimate ambition of zero harm through an uncompromising commitment to doing the right thing day after day."

"Our company message has always been Safety First. And our focus continues to be driving good behaviour and tackling complacency. For example, we have increased the number of hazard spotting tours, safety dialogues and senior leadership tours. However, it is not enough to just have more discussions, we are also working to track the effectiveness of each of these interactions."

"The company gives us all a framework in which to be safe, for instance we take a non-negotiable view of our Life Saving Rules which must be always followed by our colleagues. However, within that framework, it is essential that everyone can take responsibility for safety."

"We want everyone to be able to identify any unusual situation that could present risk and to ensure that everyone has the ability to reduce that risk for themselves and their team."

"That is why we are working on increasing risk awareness, equipping everyone with the capacity to talk to their managers and colleagues about risk and reinforcing positive messages around safety not just highlighting where things went wrong."

"We want to nurture a culture where everyone feels safe and in the 2023 Knauf Insulation engagement survey we asked our people to what extent they felt safe. The responses were encouraging, but there is still plenty of room for further improvement. We want our colleagues to know that Knauf Insulation cares for their health and safety and that we will work tirelessly to deliver on this promise."

Safety milestone

By the third quarter of 2023 a total of 611 tonnes of reinforced bars had been woven together and concrete from 1,270 trucks used to create the final panels of our new 56,000 m² US plant at McGregor in Texas.

Safety has been the top priority and more than

45,000

safe person hours

have been logged without incident.

A fire exercise gets underway at our Novi Marof plant in Croatia

CARING FOR OUR GREAT EMPLOYEES

COMMITMENT

WE ARE COMMITTED TO BUILDING A CULTURE OF WELL-BEING

2025 TARGET

Positive mental health is a priority. By 2025 all managers, newcomers and recently promoted colleagues will have received positive mental health, well-being and resilience training. Employee Assistance Programmes will also be available to colleagues facing personal challenges at work, at home or in connection with their health.

STATUS: WORK IN PROGRESS

First aid training during the annual Health Week in Slovenia

Hélène Debard, Knauf Insulation's Group Chief Human Resources Officer for EMEA & APAC, says: "Employee Assistance Programmes (EAPs) have been set up in some countries, but we are also carrying out a company-wide audit to establish EAP gaps and benchmark best practices with a view to establishing a company standard and guidelines."

"Well-being is a priority. Obviously, we thrive when we feel good. We are resilient, productive, engaged, creative and we are better people to be around and relationships flourish."

"Not only do we want everyone to bring their best version of themselves to work, we want to challenge the discrimination surrounding mental health at every opportunity and reinforce the feeling of psychological safety at work."

"As a company we are developing employee's well-being programmes,increasing awareness training for leaders and introducing self-coaching tools."

"We are supporting colleagues with home office ergonomics and well-being."

It's good to talk

Our teams in Northern Europe are committed to initiatives focused on well-being. In 2023, these included internal communications on financial well-being and the menopause, awareness around men's health, the promotion of employees' benefits and a roadshow about pensions and retirement.

Healthy body, healthy mind

During Health Week in Slovenia, colleagues at our Škofja Loka plant held a range of activities to highlight ways to boost health such as a healthy breakfast initiative, cycling day, mental health workshop, full body workouts and the measuring of blood pressure, cholesterol, and sugar levels.

RECORD RESPONSE

COMMITMENT

WE WILL HAVE THE MOST ENGAGED EMPLOYEES IN OUR INDUSTRY

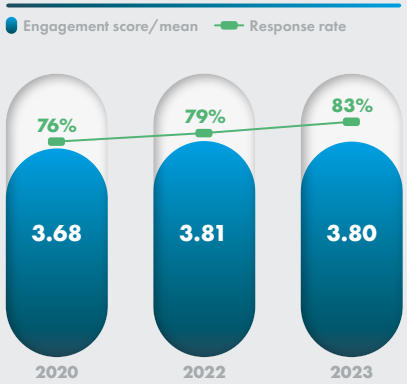
2025 TARGET

By 2025 we commit to ensure that the positive results of our company-wide surveys are higher than the industry average in every country.

STATUS: ON TRACK

Knauf Insulation's Chief Human Resources Officer Hélène Debard meets colleagues at our Lannemezan site in France

Engagement score/Response rate*



Hélène Debard, Knauf Insulation's Group Chief Human Resources Officer for EMEA & APAC, says: "Over our past three surveys we have seen a healthy increase in response rates leading to a record 83% contributing their feedback in 2023."

"A high turn-out such as this is important because the more feedback we have, the deeper our insight is into what is important to everyone at Knauf Insulation."

"I am also pleased with our 3.80 engagement score in 2023 which puts us as a company higher than 34% of manufacturing companies in the Gallup database and higher than 28% of all businesses. These surveys are essential to take the pulse of the company and high engagement figures reflect a positive workplace where people feel safe to speak up and where their opinion counts, where they can thrive and find purpose."

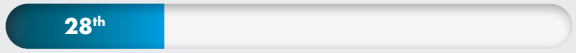
"After the 2023 results were presented to the Board, they were discussed within teams to clarify what course of action was required and how we need to amend our action plans accordingly.

"We want to improve starting from the leadership team, by focusing on recognition, care for our teams, and encouraging open feedback."

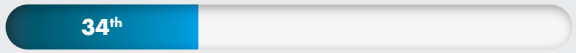
"Although our 2023 results revealed important achievements, they also highlighted a key area for improvement that we are addressing as a priority."

How Knauf Insulation compares to other companies

Percentile Rank



The mean is greater than 28% of those in the Gallup Overall database.



The mean is greater than 34% of those in the Industry – Manufacturing database.

2020-2023 COMPARATIVE SURVEY RESULTS

83%

IN 2023 A RECORD-BREAKING 83.32% OF ALL EMPLOYEES – A TOTAL OF 3,441 COLLEAGUES – TOOK PART IN OUR GALLUP ENGAGEMENT SURVEY (an increase of 8.4% in the number of participants compared to last year's survey)

+8.4% YEAR ON YEAR INCREASE

MOST POSITIVE FEEDBACK:

4.36 OUT OF FIVE EMPLOYEES SAID THEY KNOW WHAT IS EXPECTED OF THEM

4.03 OUT OF FIVE EMPLOYEES WERE HAPPY WITH THEIR MATERIALS AND EQUIPMENT IN 2023

ROOM FOR IMPROVEMENT:

3.29 OUT OF FIVE EMPLOYEES SAID THEY FEEL RECOGNISED IN 2023

3.94 OUT OF FIVE EMPLOYEES SAID THEY FEEL THE COMPANY CARES ABOUT THEM IN 2023

* Numbers based on the total participation in each Gallup survey wave given regional differences.

INSPIRING AND DIVERSITY INCLUSION

Lisa Flaherty, HR Director Northern Europe, says: "We are at the beginning of our diversity and inclusion (D&I) journey and ensuring leadership buy-in is vital to success. That is why we aim to fully onboard the HR community and senior leadership by end of 2023."

"There have been major steps forward. We are incorporating D&I into recruitment training and establishing train-the-trainer sessions to increase our capacity to train more hiring managers. We have also been refining our training sessions as they are rolled out, considering feedback and adapting sessions to ensure maximum impact."

"We have measured our cultural inclusion score in our company-wide Gallup survey to benchmark progress. In 2023 this was 3.96 compared to 4.02 in 2022."

"We recognise that D&I is a process of continuous improvement. It is not something that happens overnight. It is a culture change and an on-going journey."

"Our aim is to create inclusiveness in the workplace through the principles of equity and fairness. Equity in this context means creating more possibilities for those diverse talents which historically had less access to career opportunities. It is essential that we nurture the diversity that is integral to our success and ensure it flourishes."

Kristin Barthel
Knauf Insulation's Group Chief Financial Officer

COMMITMENT

2025 TARGET

Develop and make available core diversity and inclusion (D&I) training for employees as part of our education and training offering.

STATUS: ON TRACK

D&I ACHIEVEMENTS

- Our D&I awareness training programme is now up and running
- Our programme has been rolled out to the Board, and is ongoing for our HR colleagues and the Senior Leadership Team
- D&I pilot programmes have taken place in our Western and Northern regions and with our Central Functions (including our Innovation Team).

COMMUNITY IMPACT

COMMITMENT

WE WILL BE A POSITIVE FORCE IN COMMUNITIES WHERE WE WORK

2025 TARGET

By 2025 we want all our colleagues to become a global community of volunteers participating in social and environmental projects in their local communities in every country where we have a site – as well as abroad.

STATUS: WORK IN PROGRESS

In 2023, following a wide range of initiatives, we started to define smart key performance indicators with the aim of prioritising our community activities and improving the way we track progress in 2024.

Emergency support

Flooding in 2023 caused chaos in parts of Slovenia including in the town of Škofja Loka where we have our plant. Our colleagues organised clean-up operations to support residents in affected areas as well as fund-raising campaigns to help impacted families. The Mayor of Škofja Loka, Tine Radinja, is pictured accepting our donation from Matjaž Petrič, General Manager, Knauf Insulation Slovenia.

Our teams from Knauf Gypsum and Knauf Insulation also joined forces to support the relief effort in Turkey following the earthquake which devastated the country's southern and central regions in 2023.

Certificates of responsibility

Our team at Škofja Loka has achieved the SA8000 Standard social certification programme which is recognised as a framework for companies to conduct business in a way that is fair and decent for workers and "to demonstrate their adherence to the highest social standards".

Our Slovenian colleagues have also received the Green Star Certificate, a rating scheme which recognises the contribution business leaders make to sustainable business, climate neutrality and social responsibility.

GREEN STAR 2022 CERTIFICATE of ESG Profile and Climate Action

Continues on page 12 ›

ABOVE INSET: Mayor of Škofja Loka, Tine Radinja, accepts a Knauf Insulation donation from Matjaž Petrič, our General Manager for Slovenia, towards flood relief in the town.

MAIN IMAGE: Our colleagues organised clean-up operations and fund-raising campaigns following severe floods across Slovenia in 2023

COMMUNITY IMPACT *(continued)*

St Egidien team unveil a new open air classroom in Germany

Krupka colleagues work on community projects in the Czech Republic

Our UK St Helens team created a new garden for local school on Community Team Volunteering Day

Inspiring community goodwill

We are committed to reinforcing positive relations with our communities wherever we have sites. Community initiatives in 2023 included:

- In Germany our St Egidien colleagues helped build a small open-air classroom for the local community which opened in the summer of 2023.
- Colleagues at our Târnăveni site in Romania participated in a range of community activities in 2023 including sponsoring a fire brigade sports event and participating in the Târnăva Marathon.
- Our Novi Marof plant in Croatia continuously contributes to the community through the sponsorship of cultural and sports events as well as donations to projects and activities that improve lives. A roundtable event for our colleagues and community representatives is held every year.

Making a difference

Colleagues at our Krupka plant in the Czech Republic dedicate around 200 hours to community projects and events every year. The site has also supported the KŘESADLO award for the past 15 years which recognises outstanding community champions.

Positive impact of Community Volunteering Days

Our St Helens team in the UK have been making the most of Community Team Volunteering Days:

- In October 2023, among a range of other activities, our volunteers conjured up their green-fingered magic to return the Rainbow Garden of the local Tunza charity back to its former glory.
- Meanwhile earlier in 2023, at St Mary's and St Thomas' Primary School, the team gave the school garden a makeover and planted a new science garden for youngsters to enjoy fresh air lessons.

On the run for funds

Our colleagues in Spain took part in a charity race to raise funds for the Children's Autism Association in Barcelona. The money will be used by the association to support members of families who are impacted by autism.

American all-stars

Our North American colleagues are continuously committed to making a positive impact in their communities.

Towards the end of 2023, work on our new US plant at McGregor in Texas was well underway and we were building goodwill with the local community through sponsored programmes, social media and a QR code where residents could follow progress and apply for jobs.

We are also partnering with the local Chamber and Economic Development Council and will participate in job fairs, college career days and military job transition programmes.

In May 2023, our Shelbyville colleagues helped to raise US$110,000 for non-profit organisations for the annual Shelby County United Fund in Shelbyville, Indiana. Our colleagues have taken part in the fund for the past 40 years and pledged hundreds of volunteer hours and over US$2 million.

Meanwhile, more than 200 colleagues across the company in North America took part in the first company-wide Week of Service in November 2022 and, sporting their Knauf Cares T-shirts, collected more than 1,500 kg in food donations for an estimated 3,100 families. Knauf Insulation North America also donated US$40,000 to local food banks.

ABOVE: Our North American colleagues proudly display their Knauf Cares T-shirts

LEFT: Our Spanish team prepare to race to raise funds for the Children's Autism Association in Barcelona

MISSION TO ZERO

COMMITMENT

WE WILL AIM TO DELIVER NET ZERO EMBODIED CARBON PRODUCTS AND SOLUTIONS

2025 TARGET

We have set a goal of reducing the specific embodied carbon of our products by 15% compared to 2021.

STATUS: ON TRACK

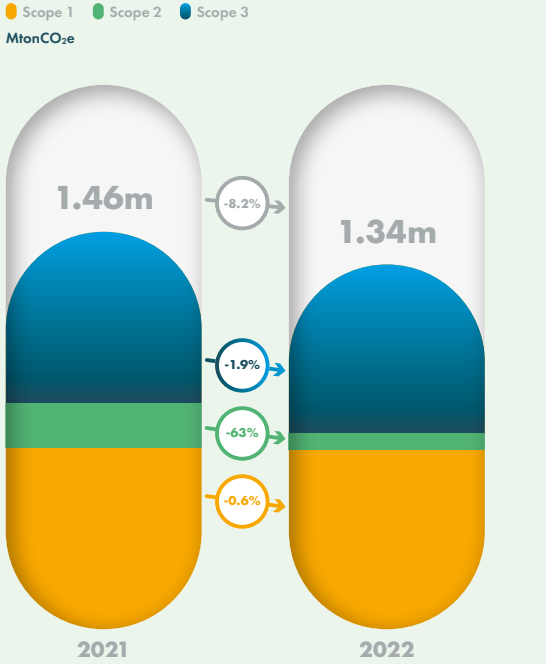
We are making significant progress in green electrification and increasing our use of secondary raw materials which reduces emissions.

SCOPE 1
2021 to 2022
0.6%
REDUCTION OF EMISSIONS
GENERATED DIRECTLY FROM OUR SITES

SCOPE 2
2021 to 2022
63%
REDUCTION OF EMISSIONS
GENERATED INDIRECTLY FROM ELECTRICITY WE BUY

SCOPE 3
2021 to 2022
1.9%
REDUCTION OF EMISSIONS
GENERATED FROM OUR VALUE CHAIN

Knauf Insulation's reduction in full scope greenhouse emissions (absolute) for our Mineral Wool



Reducing the specific embodied carbon of our products by 15% compared to our 2021 baselines means cutting scope 1 greenhouse gas emissions generated by our sites, scope 2 emissions from the electricity we buy and scope 3 emissions which are generated from our value chain, such as raw material extraction, transportation, packaging and end-of-life disposal of our solutions.

From 2021-2022, we reduced absolute emissions from scope 2 by 63% and, cut scope 3 emissions by 1.9% and scope 1 emissions by 0.6%.

Our goal to cut the embodied carbon of our solutions by 15% is highly ambitious, but during the past two years we have made important progress particularly in the sourcing of renewable energy for manufacturing which makes up 65% of our products' carbon footprint.

An important challenge that we face is that our company is growing intensively and key to reaching our targets is to drastically increase our efficiency, switch from fossil fuels to electricity, particularly renewable electricity, and ensure every new asset comes with a low CO_2 footprint.

Jean-Pierre Pigeolet
Knauf Insulation's Decarbonisation and Life Cycle Sustainability Manager

HOW WE ARE TACKLING EMBODIED CARBON

Recycled content

We are increasing the percentage of recycled content in our batch because it reduces the energy we need to manufacture our solutions. At our Johor Bahru plant in Malaysia, for example, **we are steadily increasing our recycled content towards our 80% target**, whereas previously used glass sources were limited. We are also using more slag steel by-product in our Rock Mineral Wool. Overall, we are stepping up our purchasing processes to extend the percentage of recycled raw materials used at all our plants wherever possible.

Green energy

Since 2022 we have been buying energy with Renewable Energy Certificates, which certify the energy is from sustainable sources for six of our Glass Mineral Wool plants, secured for three years. We are now working to secure low carbon electricity for all our plants.

Continuous improvement

Our Sustainability Engineers are constantly finding and sharing new ways to save energy. For example, thanks to continuous improvement, our Visé plant in Belgium has increased the electricity use of its furnace – which can operate on natural gas and electricity – from 15% to 20%.

Future technology

We are carrying out research into the opportunities of hydrogen and bio-gas technology as well as carbon capture. We are also examining new technology to decarbonise the coke-heavy production of our Rock Mineral Wool using electrical systems which can use renewable sources.

New investments

Investments totalling £45 million at our plants in the UK include the multi-million-pound construction of a new furnace at our St Helens site which will increase capacity by around 3,000 tonnes a year, enable us to create new solutions and improve our product compression. As a result, we expect to see a **20% decrease** in the embodied carbon of products from the plant.

Best in class technology

At our new McGregor plant in Texas, scheduled to open in 2024, we have installed the most energy efficient technology available and will continuously work to improve the site's energy management to ensure that while our company expands, our carbon footprint remains under control. Meanwhile, our newly acquired Târnăveni site in Romania will be upgraded to achieve high levels of energy efficiency.

Better packaging

Along with optimising packaging thickness to use less plastic and increase of recycled plastic content, we use compression technology to maximise transportation loads.

Improving transport

We use trucks with energy efficient engines and optimise networks to cut delivery distances and fuel consumption. We are also constantly working to source suppliers closer to our sites, exploring new possibilities of rail transport in Germany and have introduced 25.5 metre ECO-COMBI trucks in Belgium that **cut emissions by up to 20%**.

On track to cut carbon

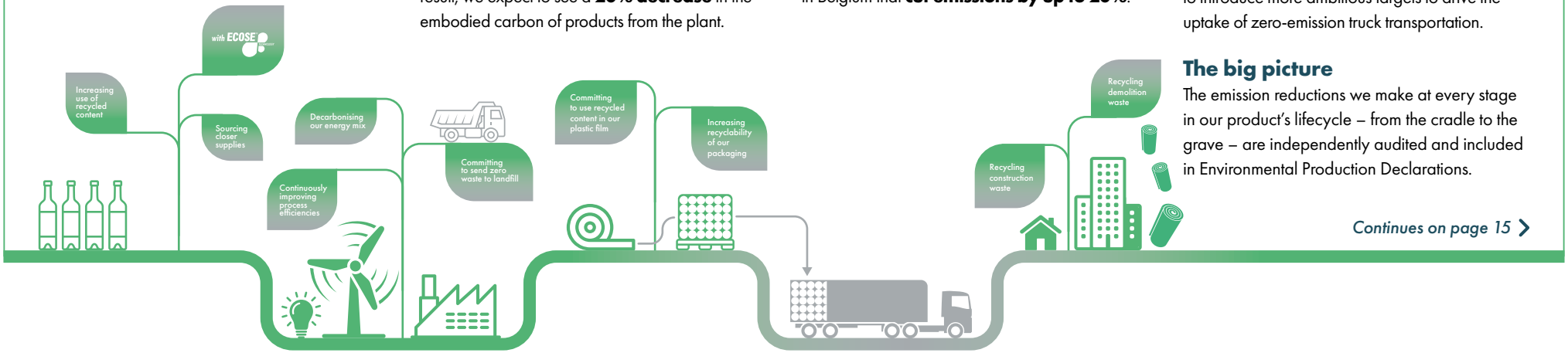
In North America we own **over 200 railcars** which are used to deliver the used glass we convert into cullet raw material for our Glass Mineral Wool.

Optimised logistics

A **£5 million investment** in an upgrade of packaging equipment at our Cwmbran plant in the UK will not only help us meet increasing demand but also enable us to optimise our logistics by taking around 1.5 million truck miles off the road and reducing transport CO_2 emissions by 1,700 tonnes every year. The new equipment is also **40% more energy efficient** than existing machines helping us to shrink our carbon footprint further.

Call for stricter standards

With the aim of reducing the transportation carbon footprint of our suppliers, Knauf Insulation joined forces with 40 other companies in 2023 to sign a letter calling for stricter CO_2 standards for trucks and for European Union policy makers to introduce more ambitious targets to drive the uptake of zero-emission truck transportation.



The big picture

The emission reductions we make at every stage in our product's lifecycle – from the cradle to the grave – are independently audited and included in Environmental Production Declarations.

Continues on page 15 ›

OUR NEW DUAL-FUEL TRUCK WILL TRAVEL

100,000 KM

EVERY YEAR

THE TRUCK WILL REDUCE EMISSIONS BY

6 TONNES

COMPARED TO A DIESEL VEHICLE

WHEN USING BIOMETHANE EMMISIONS CAN BE CUT BY

50%

Driving change

A methane-diesel dual-fuel truck is now transporting Knauf Insulation solutions between our Slovenian System Division sites at Škofja Loka and Ajdovščina.

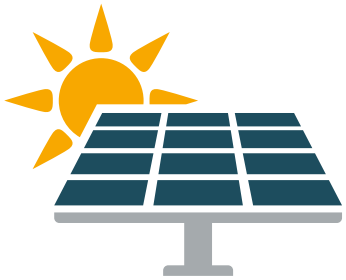
The environmental impact of this pilot initiative which started in 2023 is significant. When natural gas is used as a fuel and methane is the dominant component, CO_2 emissions can be reduced by 12.5% and when biomethane is used, emissions can be cut by 50%.

We estimate that the vehicle will travel 100,000 km every year, resulting in a reduction of six tonnes of CO_2 emissions compared to a traditional diesel truck. We are now aiming to secure long-term supplies of biomethane to ensure the truck achieves its full potential.

Power of wind and solar

The installation of photovoltaic panels is increasing across our sites.

At our Visé plant in Belgium, for example, we reached 9,000 panels in 2022 producing 3,000 MWh/year. In addition, a new windmill expected to generate more than 10% of the site's power, will be added to the plant once approval is granted.



9,000

SOLAR PANELS AT OUR VISÉ SITE PRODUCE

3,000 MWh/year

Solar power is also already online at our Škofja Loka plant in Slovenia. We are also close to finalising a contract for the installation of photovoltaic panels at Simbach in Germany which will cover almost 20% of the plant's electricity consumption.

We will also install photovoltaic panels at our other German sites at St Egidien and Bernburg, and plans are underway to connect these plants to nearby windmill parks.

Simbach's zero carbon ambition

In 2023 our Heraklith Wood Wool brand celebrated a hundred years since being patented by working towards zero carbon target at Simbach plant in Germany.

Driving this ambition is a plan to connect the site to a geothermal borehole which provides much of the energy used to heat the town of Simbach and is just 50 metres from the plant.

Geothermal energy will be first used to heat offices, then manufacturing halls and finally production.

The plant is also installing photovoltaic panels, LED lights, switching from gas to green electricity and plans to use production scraps for heating. A second new energy efficient line was also planned for 2023.

By the end of 2023, the goal was to reduce plant energy consumption by 25%.

To reduce the embodied carbon of our Wood Wool we aim to replace our binder with in-house recycled materials and reopen the town's railway station for supplies and product distribution.

Sustainable solutions

Heraklith products – including our new TwinTech combination solution – improve building sustainability by delivering outstanding thermal and acoustic performance as well as fire-safety peace of mind. The wood used in our Wood Wool solutions is certified by the Programme for the Endorsement of Forest Certification (PEFC).

OUR ZERO WASTE CHALLENGE

COMMITMENT

WE WILL SEND ZERO WASTE TO LANDFILL

2025 TARGET

We will be sending zero production waste to landfill from our Glass Mineral Wool, Rock Mineral Wool plants by 2025.

STATUS: FOCUSING ON CHALLENGES

Our production waste to landfill increased from 2021 to 2022 by 47.8% mainly due to teething problems in the first full year of operation of a greenfield start-up plant.

To accelerate our drive to zero waste, we need to continuously improve scrap reduction during manufacturing, feed more off-cuts back into the production process and ensure more waste is externally recycled into new products, for example, as ceiling tiles.

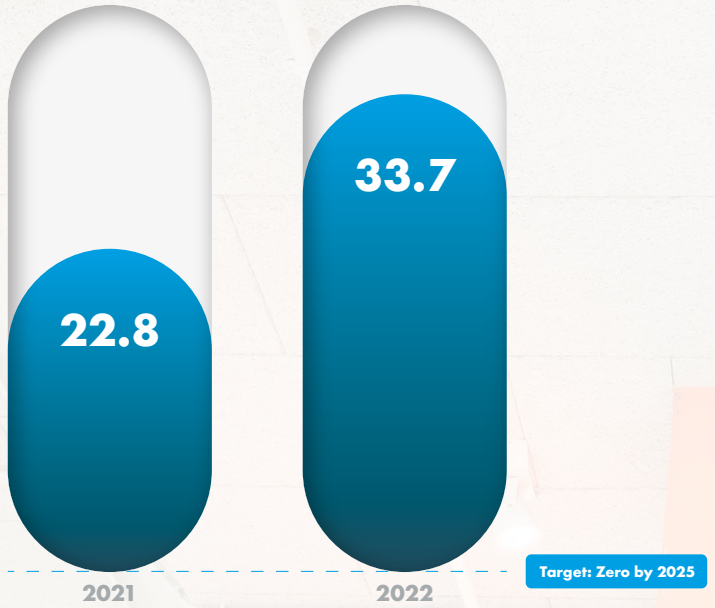
We are stepping up the ambition of our roadmaps at each plant to drive zero production waste to landfill and exploring new innovations and opportunities to reuse scrap.

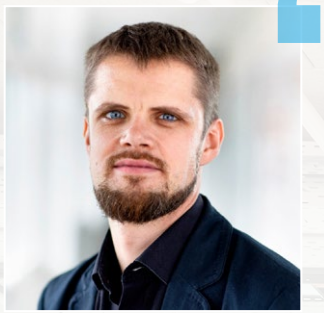
As a result of such initiatives, for example, our Wood Wool division has been sending zero waste to landfill since 2022.

We are also streamlining how production off-cuts from plants can be transformed into new Knauf Insulation products at our Belgian recycling plant using our RESULATION service.

By June 2023, our greenfield challenges had been resolved and many of our plants were recording lower volumes of waste to landfill due to continuous improvements.

Waste to disposal, kg per tonne of net nominal output





Simbach, Germany; Zalaegerszeg, Hungary; Cwmbran, UK; Škofja Loka, Slovenia and Novi Marof in Croatia are now sending zero waste to landfill. But to build on this success and improve the maturity of our zero-to-waste roadmaps we are sharing best practices and providing expertise from our Central team. We are also exploring new ways of creating new products from scrap and focusing on production innovation to reduce waste.

Lars Koch | Knauf Insulation's Circular Economy Manager

INCREASING RECYCLED CONTENT

COMMITMENT

2025 TARGET

We are committed to using more than 65% external recycled material such as used glass for our Glass Mineral Wool and more than 25% external recycled material – such as waste steel known as slag – for our Rock Mineral Wool by 2025.

STATUS: WORK IN PROGRESS

We improved the amount of recycled content in our Rock Mineral Wool batch from 11% to 13% from 2021 to 2022.

However, in terms of recycled content in our Glass Mineral Wool batch, we saw a decrease of 9% from 64% to 55% in the same period.

Using recycled content saves landfill and requires less energy to be turned into Mineral Wool which improves performance and reduces our carbon footprint which is good for business and our environmental impact.

Unfortunately, sourcing large volumes of quality recycled materials that meet our standards can be challenging in some markets.

Our purchasing team is giving more focus to recycled content, and we are planning a dedicated taskforce to develop new value chains.

For example, at our Malaysia site in Johor Bahru, we are increasing our recycled content towards our 80% target from a low starting point.

In addition, our RESULATION facility at Visé in Belgium is fully operational to recycle waste Mineral Wool from demolition sites and off-cuts from our plants and customer construction sites.

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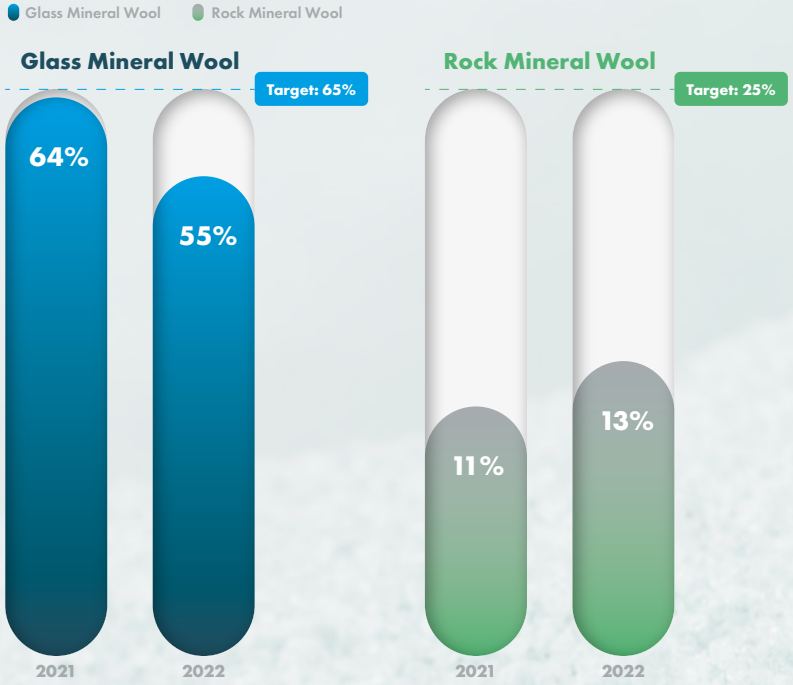
Percentage of recycled content in our products



Blowing Wool's sustainable benefits

Our SUPAFIL® Blowing Wool consists of 99% glass – most of which is recycled. The remaining 1% includes silicone to ensure the product repels water and mineral oil and antistatic to reduce dust and electrostatic charge. Blowing Wool is independently certified free of any harmful Red List substances by Declare, a label established by non-profit organisation the International Living Future Institute.

LEARN MORE: knaufinsulation.com/welcome-to-world-of-supafil

ROADMAPS TO SAVE WATER

COMMITMENT

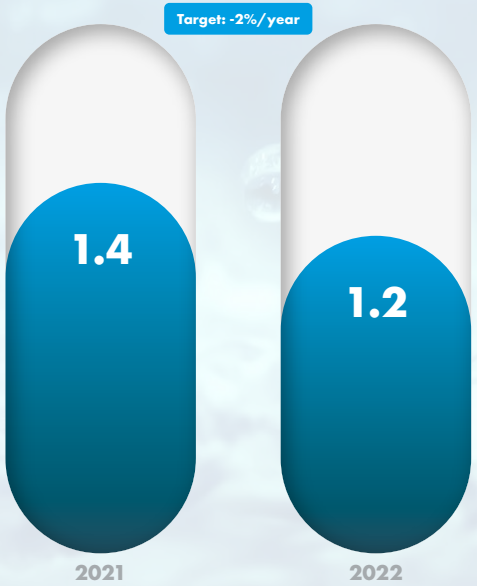
2025 TARGET

We will have implemented a range of new projects to reduce the amount of fresh water we use in five plants.

STATUS: WORK IN PROGRESS

Our water consumption decreased by 14% from 2021 to 2022. Every plant is now working on building a roadmap to reduce water use and sharing best practice supported by expertise at Central teams in Belgium. Our dedicated on-site Sustainability Engineers ensure the data we collect is increasingly detailed and reliable, which informs our decisions going forward.

Water consumption, m^3 per tonne of net nominal output



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TAKING BACK CUSTOMER WASTE

We are committed to take back 25% of customer waste from job sites wherever possible by 2025.

Our RESULATION service has been collecting Rock Mineral Wool, Glass Mineral Wool as well as Tektalan Wood Wool off-cuts from construction sites since 2020 in Germany and since 2021 in Austria.

We are now building on this success with plans to further expand the service offer across more markets.

Our RESULATION service is successfully recycling off-cuts of Mineral Wool from our plants and our customers' construction sites as well as demolition sites and turning this material into new Mineral Wool.

We are now stepping up our recycling ambitions by forming partnerships with waste management companies across Europe as well as campaigning for better separation of waste at source to increase the volume of quality raw material we can use.

Thomas Baguette | Knauf Insulation's Mineral Wool Recycling Business Development Manager

PACK IT SMART!

We will reduce our virgin plastic film packaging by more than 25% by 2025.

In 2023, 25% of our plants in Continental Europe introduced 30% of recycled content into their packaging without any compromise in the efficiency of handling, storage or transportation. Trials are now underway for a full implementation in 2024 and 2025.

Additionally, our sites use compression technology to allow larger delivery loads per cubic metre, improve storage for customers and reduce truck miles, emissions and fuel use.

It is essential that we cut the volume of plastic we use and at the same time ensure that our packaging is strong enough to be compressed effectively and robust enough to withstand bad weather, haulage and on-site handling

The use of 30% of recycled material in our packaging will enable us to shrink its carbon footprint by 25%.

Sustainable by design

We have introduced new packaging with a lower environmental impact for our European customers that features a maximum of two colours on a white base film and uses up to 70% less ink. The packaging with our instantly recognisable branding uses ink that covers only 15% to 18% of the overwrap film.

70%
LESS INK IN OUR EUROPEAN PACKAGING

Pallet and plastic takeback

Our Regional Sustainability Managers are working to create the best practices needed at our sites to drive our 2025 target to collect, sort, repair and reuse 35% of our wooden delivery pallets as well as recycle between 25% and 50% of our plastic film.

Around 80% of wooden, metal and plastic pallets are being returned to our Škofja Loka plant in Slovenia for reuse and we are taking back 10% of our wooden pallets in France.

We reuse more than 6,200 wooden pallets at our Eskişehir plant in Turkey, and 15,000 pallets in Benelux and Germany. At our Surdulica site in Serbia we reused 2,490 wooden pallets and 13,300 metal pallets.

OUR BUILDING CHALLENGES

Energy efficiency

Today, 75% of buildings in the European Union are energy inefficient and the EU renovation rate is just 1% per year. We must increase this rate to 3% and ensure all renovated buildings are as energy efficient as possible because 85% of them will still be standing in 2050.

Climate resilience

Extreme weather events will become increasingly frequent so it is essential that our buildings are climate resilient – able to withstand extreme temperatures – while maintaining a healthy comfortable environment for building users.

Building well-being

More than 90% of our time is now spent indoors and we are more aware than ever of the health implications of our buildings from the impact of temperatures and air quality to noise pollution and fire safety. Ventilation, fire safety, healthy indoor temperatures, good air quality and the reduction of unwanted sound are the cornerstones of our approach to Creating Better Buildings.

Net-zero ambition

Achieving a climate-neutral Europe by 2050 will require buildings to become net-zero in both operational (generated during the building operations) and embodied (generated during the life cycle of building materials used) carbon. This must start with deep renovation of our existing buildings, as well as the proper design of new buildings to favour flexibility, multiple use and the application of decarbonised and/or recyclable materials.

Energy poverty

More than 36 million Europeans were unable to keep their homes warm in 2020. Since Russia's invasion of Ukraine, energy prices have soared, winter supply concerns are constant and extreme weather has underlined the challenges of poorly insulated buildings.

This modernist family home in Spain, certified by Passivhaus and designed by CSO Arquitectura, features a unique market-certified passiv façade which was developed by Knauf and Knauf Insulation with Aquapanel, Knauf gypsum boards as well as our Panel Plus TP138 and Ultracoustic Plus solutions with E-Technology®

THE POWER OF RENOVATION

A 2023 report by the Building Performance Institute of Europe (BPIE) – drawn up with support from Knauf Insulation – has demonstrated how energy demand for heating in residential buildings could be reduced by 44% if all European Union residential buildings were effectively insulated.

Such a contribution would help to achieve the EU's net-zero ambitions as well as significantly strengthen Europe's energy security, says the BPIE.

The institute demonstrated the need to scale up EU renovation rates by modelling two renovation scenarios.

The first assumed a 2% renovation rate – as outlined by the European Commission's Renovation Wave Strategy – is achieved by 2030 and then remains static until 2050. The result? The 2% rate would not achieve Europe's climate goals and 30% of buildings would be left unrenovated, wasting 235 TWh of energy savings.

Under the full renovation scenario, the present rate of 1% would double by 2030, followed by 3% by 2035 and 4% by 2040. This would not only achieve Europe's climate goals but reduce energy demand for heating in buildings by 777 TWh or 44% compared to 2020.

LEARN MORE: bpie.eu/publication/how-to-stay-warm-and-save-energy-insulation-opportunities-in-european-homes/

Campaigning to scale up renovation rates: Quentin Galland-Jarrett, our Group Public & Regulatory Affairs Director, and Katarzyna Wardal-Szmit, our EU Public Affairs Manager

Quantity driven by quality

Quality renovation needs to be at the heart of any mass scaling up of building retrofits.

Knauf Insulation campaigns for meaningful Minimum Energy Performance Standards for buildings to ensure maximum energy and carbon savings as well as improving the living conditions of those in fuel poverty.

What is meant by meaningful? Renovating the worst-performing buildings to the highest efficiency standards based on measured energy savings and at least doubling the current renovation rates by 2030.

We are also urging policymakers to introduce turnkey 'one-stop shops' in the recast of the Energy Performance of Buildings Directive to ensure building owners can easily navigate the complexity of a successful renovation such as accessing finance, subsidies, reliable expertise, guaranteeing quality work and solutions that deliver real performance. One-stop shops should be open to private sector actors that can offer necessary expertise and technologies needed to reach the scale of the European Union's Renovation Wave ambition.

Tour de force

Our RT PLUS systems were used extensively in the renovation of this traditional farmhouse and extension in France.

Following the retrofit, it is estimated that the installation contributed to a 25% energy saving for the walls and a 30% saving in the attic.

RT PLUS is our latest two-in-one innovation and combines Mineral Wool with an aluminium barrier to provide a reliable seal against air and water vapour as well as outstanding energy saving performance. RT PLUS also features our ECOSE Technology® binder with no added formaldehyde.

Available in systems for walls or attics, RT PLUS is easy to install, offers high thermal performance and is ideal for renovation as well as new-builds.

Throughout 2023 we organised a roadshow in 23 key locations in France with a specially customised show truck to demonstrate the benefits of RT PLUS to our customers.

CLOSING THE ENERGY SAVINGS GAP

Pictures taken from The Spaces That Shape Us series.

Knauf Energy Solutions (KES) has carried out the high-quality renovation of 63 social housing units in the Gansbeek area of Bilzen in Belgium delivering a 60% average reduction in energy costs.

This KES project, completed in 2023 and featured in the Series initiated by World Green Building council with BBC StoryWorks: The Spaces That Shape Us, is a vivid demonstration of our commitment to improving living conditions for residents and delivering real performance – real time audited energy savings – using digital technology, quality solutions and quantifiable retrofit processes.

The retrofits were carried out in collaboration with the housing company Wonen in Limburg and service provider Fluvius and included the expert installation of insulation solutions, high-efficiency windows and doors and state-of-the-art hybrid heat pumps.

This KES renovation, along with many more we have carried out, was delivered with minimal disruption to residents who reported experiencing significant improvements in comfort following the upgrades.

The renovation also highlights why we have consistently called for the use of independently certified energy efficiency meters to monitor real performance as a reliable alternative to Energy Performance Certificates (EPCs) which are based on theoretical calculations from questionnaires.

RENOVATION DELIVERED **60%** AVERAGE REDUCTION IN ENERGY COSTS

Such 'real life' metering at scale would also pave the way for national pay-for-performance schemes to reward savings achieved by renovation.

To further demonstrate the gap between theoretical and real performance, KES replaced existing loft insulation in 23 recently built UK homes, with the same loft insulation but this time using state-of-the-art installation methods.

Following the installation, efficiency improvements were digitally monitored and an average energy saving of 14% was recorded.

However, after the retrofit, the buildings' EPC ratings remained static despite the improved level of energy efficiency.

Inevitably, this situation confirms that theoretical measurement methods fall short in demonstrating the intrinsic performance of buildings.

Scan the QR code to watch the film or visit: bit.ly/KI-Halle-Belgium

HOW TO SAVE €3.5 TRILLION

Ensuring an energy efficient building is not just about cutting carbon and saving energy but also about reducing the load on the grid during peak periods.

The issue of peak demand has soared to the top of energy agendas especially in the light of the EU's RePowerEU strategic aim to install 30 million electric heat pumps by 2030.

However, new research by Knauf Energy Solutions (KES) has underlined how energy efficient renovation must be put in place first to reduce peak demand and maximise the potential of these pumps by ensuring an effective building envelope.

In other words, buildings must be 'heat pump ready' to avoid major power gridlock.

The research found that if all domestic heating was moved to heat pumps and all cars to electric, the EU's electricity demand would rise from 2,640 TWh/year to 3,946 TWh/year.

Furthermore, as heat pumps would be mainly used on cold days, the electric winter peak would rise to 15,849 GWh/day from 9,146 GWh/day.

To meet this peak, the research estimates that the EU will need 9,883 TWh/year of generation capacity which is 3.7 times higher than the current electricity supply.

The report analyses the impact of a 36% heat demand reduction which would cut demand for electricity by 347 TWh/year as a result of improving the building envelope.

In turn, as this reduces the winter peak of demand, the reduction would shrink the total generation required from 9,883 TWh/year to 8,154 TWh/year producing savings of 1,729 TWh/year or up to €3.5 trillion savings in energy costs over 20 years.

In a separate 2022 study by KES, our researchers concluded that the generation capacity required to meet peak demand for electric heating in Germany would be almost five times greater than today.

Casa Sophia has been certified by Passivhaus and awarded the highest `five-leaf' level of certification by the Spanish Green Building Council. The villa was built by 100x100 Biopasiva and 100% of the waste generated during construction was recycled or recovered. Construction emissions were completely offset and the building's carbon footprint is 76% lower than conventional home. The villa features our **Urbanscape green roof solution** and our **Smart Wall FKD-N Thermal** and **Panel Plus TP138** solution with E-Technology® which is certified by DECLARE as containing no harmful ingredients.

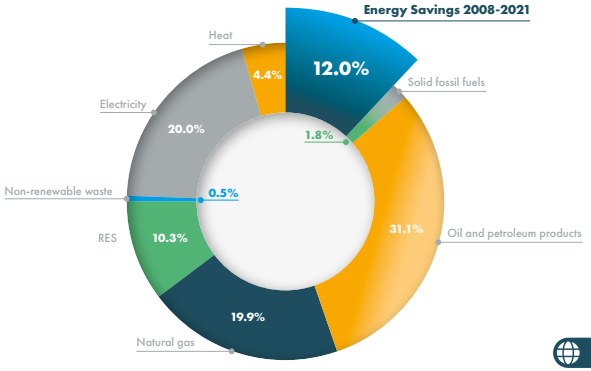
MAKING SAVINGS MATTER

Energy efficiency is rightly considered "the first fuel" in policy debates, as there is no cleaner and cheaper energy than the one which has not been consumed. At the same time, energy efficiency is typically absent from energy balances, which makes it difficult for energy savings to become part of every energy strategy.

Bearing this is mind, scientists from the Institute for European Energy and Climate Policy in their study Make Energy Efficiency Visible in the Energy Mix supported by the European Climate Foundation and Knauf Insulation analysed possible ways to add energy savings to national and European Union energy mixes next to energy sources such as renewables, gas and coal in a structured way.

The researchers said: "For energy efficiency to be really considered as an energy resource on a level playing field with other energy resources, energy efficiency improvements need to be monitored. Then, energy efficiency data need to be integrated with energy data about other energy resources."

EU27's final energy mix in 2021, including savings



So how will this be achieved?

The study integrated 2021 big picture 'energy savings' data from the ODYSSEE-MURE project – which has been monitoring energy efficiency indicators and policies in Europe for over 30 years – with Eurostat data on 'supply' energy carriers such as oil and gas for the 27 EU countries*.

The researchers then demonstrated the impact that energy savings made on an energy mix, using graphs with energy savings included, such as the example below.

This revealed that in 2021 energy savings contributed 12% to the European Union's energy mix, 12.7% to the energy mix in Germany, 13.6% in France, 14% in Italy, 16.3% in Spain and 10.4% in Poland.

The study also examined how energy efficiency is represented in publications by international organisations such as Eurostat, the European Environmental Agency and International Energy Agency and national publications in France, Germany, Italy, Poland and Spain.

The researchers found that when it came to the headline energy figures of these publications "the quantitative contribution of energy efficiency to the energy mix was missing in the main pictures of the energy balance" while energy efficiency was often included in "last chapters" or separate reports.

In graphs, energy efficiency is often not "put next to the contribution of other energy sources" forming final energy consumption, the researchers said. Out of sight, out of mind: having energy efficiency discussed apart means decision makers first see issues related to energy supply.

The study made suggestions for a better integration in both ways: integrating energy efficiency data in the main energy publications and making the link with the energy mix.

LEARN MORE: ieecp.org/publications/make-energy-efficiency-visible-in-the-energy-mix

*The shares for each energy carrier (including energy savings) are calculated from the final energy that would have been consumed in 2021 in the absence of the energy efficiency improvements achieved from 2007 up to 2021, considering year-to-year changes in energy efficiency indicators.

Rethinking the energy mix

At Knauf Energy Solutions (KES) we demonstrated that **the quality retrofit of 400,000 homes** would save the same amount of energy as would be generated by a one-gigawatt power station in a year for a fraction of the cost. KES technology showcases how energy efficiency can be measured in the same way as energy generation – meaning a kilowatt hour of energy saved is the equivalent to a kilowatt hour of energy supplied.

IN A STUDY SUPPORTED BY THE EUROPEAN CLIMATE FOUNDATION AND KNAUF INSULATION, SCIENTISTS FROM THE INSTITUTE OF EUROPEAN ENERGY AND CLIMATE POLICY FOUND ENERGY SAVINGS HAD CONTRIBUTED:

12.0% TO THE EU'S ENERGY MIX

10.4% TO POLAND'S ENERGY MIX

12.7% TO GERMANY'S ENERGY MIX

13.6% TO FRANCE'S ENERGY MIX

14.0% TO ITALY'S ENERGY MIX

16.3% TO SPAIN'S ENERGY MIX

CAMPAIGNING FOR ENERGY EFFICIENCY

Our Public Affairs team and associations provide expert insight to drive energy efficiency to the top of political agendas around the world and shape the change that creates better buildings.

UNITED KINGDOM

Knauf Insulation in the UK has created a coalition of trade associations and NGOs to call for Energy Performance Certificates (EPC) to be informed by real performance to drive effective new build and renovation policies. Recommendations include introducing in-situ measured data systems to ensure the integrity of EPCs rather than present-day theoretical calculations that can incorrectly estimate energy demand by up to four times the actual use. Our work with Knauf Energy Solutions, which has been involved in renovating dozens of UK homes to a high standard, has been providing insight into how this performance gap should be managed.

GERMANY

Our Public Affairs team has consistently campaigned to keep energy efficient buildings at the top of Germany's political agenda to ensure the country's building stock is climate neutral by 2045. In 2024, the government was expected to increase its funding for energy efficient renovations and climate-friendly new builds to €18.9 billion. Thereby, the funding rates should also be increased from 15% to 30%. Our team continues to demonstrate the importance of an energy efficiency first approach to buildings and the essential role of Mineral Wool. In Germany subsidies are available for heat pumps but only if buildings are well insulated first.

NETHERLANDS

The government is implementing renovation programmes to make residential and non-residential buildings more energy efficient supported by the investment subsidy for sustainable energy (ISDE). The move is in line with the EU's strategy to reduce Europe's greenhouse gas emissions by 55% and will see, for example, the elimination of rental homes with low energy ratings of E, F and G by 2030. Our team in the Netherlands has launched a programme to help owners unlock the opportunities of the ISDE which offers subsidies for insulation as well as offering programmes that demonstrate how Mineral Wool can pay a key role in creating energy efficient buildings.

AUSTRALIA

Following campaigning by Knauf Insulation and our associations, a new building code NCC2022, designed to improve energy efficiency by 25% in new residential buildings, came into force from 2023. We are also providing our expertise to help shape Australia's National Energy Performance Strategy by highlighting the importance of technology to measure real energy saving performance in buildings rather than using theoretical calculations. In addition, we are contributing to Australia's Reliable, Affordable, Clean, Energy initiative – known as RACE for Homes – which has the ambitious aim of implementing energy upgrades in five million of the existing 10 million homes in Australia, with a target of completing one million of those upgrades by 2030.

NEW ZEALAND

Our Public Affairs team joined forces with industry groups to support policymakers in the creation of a new energy efficiency building code that came into force in 2023. Compared to the previous legislation, the new H1 code ensures a 40% improvement in energy efficiency for new homes and a 25% improvement for non-residential buildings. Our team is now advising industry stakeholders in the most effective ways to achieve these new targets.

Mark that matters

Our DriTherm® Cavity Slab has become one of the first building products in the UK to carry the independently verified Code for Construction Product Information (CCPI) mark which drives standards by ensuring trust in the delivery of performance as manufacturers provide their customers with reliable product information that is "clear, accurate, up-to-date, accessible and unambiguous".

SUPAFIL® Blowing Wool provided the cavity insulation for this new residential development in Emmen in the Netherlands where the government is implementing wide-ranging building energy efficiency initiatives

CAMPAIGNING FOR ENERGY EFFICIENCY *(continued)*

POLAND

New analysis on how Minimum Energy Performance Standards (MEPS) could be introduced in Poland was presented to the Ministry of Development and Technology in October 2023. The research by scientists from the Warsaw School of Economics, supported by Knauf Insulation, was drawn up in the light of the revision of the Energy Performance of Buildings Directive. The report urged policymakers to assess buildings and introduce energy classes; introduce and customise MEPS where necessary; provide financial assistance and advice for renovation and use the opportunity of new standards to innovate and modify existing energy efficiency support programmes. The report demonstrated that MEPS proposed at European level would be an effective tool to operationalise the Polish Long-Term Building Renovation Strategy, which recommended an annual renovation rate higher than 3% by 2030.

SLOVENIA

Our Public Affairs team in Slovenia has contributed content to an ambitious national-level revision of the Energy Performance of Buildings Directive which includes opportunities for improved energy efficiency measures for building envelopes. 2023 saw the launch of our new Knauf Insulation KI ENERGIJA 23 building physics software for architects to ensure they are ahead of the new legislation and have the insight they need to navigate changes effectively.

Podčetrtek Sports Hall in Slovenia features our Rock Mineral Wool NaturBoard VENTI which delivers highly effective acoustic and thermal performance as well as being certified A1 for fire safety

ITALY

The Italian government has dismantled many of the Superbonus scheme incentives that saw 417,187 buildings benefit from more than €81 billion in energy saving investments from January 2021 to June 2023. A downsizing of the measure, including decreasing tax off-setting from 110% to 90%, has undermined the Superbonus' success. Our team is now calling on policymakers to stabilise the scheme until at least 2030, conditioning the percentage of the fiscal incentive to the depth and quality of the interventions and strengthening the financial mechanisms to transfer the tax receivables to third parties.

SLOVAKIA

Two-thirds of single-family homes in Slovakia need renovation, according to research by Buildings for the Future sponsored by Knauf Insulation. The study found that owners of these homes have a high appetite for renovation but face challenges. Using this data and in the light of the energy crisis, we campaigned for fast response measures that focus on energy efficiency rather than energy prices in the winter of 2023-2024. We also urged EU policymakers to endorse an ambitious revision of Minimum Energy Performance Standards in the Energy Performance of Buildings Directive so national governments can send positive signals to single-family home owners and commit to long-term incentive programmes that help them renovate their homes.

EUROPEAN UNION

The revised Energy Efficiency Directive in 2023 saw the EU setting a binding target of at least a 11.7% reduction in final energy consumption by 2030 compared to 2020 which is 9% more ambitious than the previous target. Member States are also obliged to annually renovate 3% of all public buildings to near-zero energy building levels.

Warm welcome for policymakers

In 2023, the Prime Minister of Croatia Andrej Plenković toured our plant at Novi Marof; the Czechia Environment Minister Petr Hladík visited our Krupka site and our Visé plant in Belgium welcomed visits by Belgian Federal Deputy Mathieu Bihiet and President of the Walloon Parliament André Frédéric. Meanwhile, our Chief Operating Officer David Ducarme and Public & Regulatory Affairs Director Quentin Galland-Jarrett discussed the importance of building energy efficiency with Diederik Samsom, Head of the Cabinet of Frans Timmermans, at the time the European Commission's Executive Vice-President.

Strengthening partnerships

Alexander Knauf, General Partner of the Knauf Group, highlighted how our solutions contribute to sustainable construction during a panel discussion to open the 2023 German-Romanian Business Conference in Berlin. The conference focus was on strengthening economic and political partnerships between the two countries. The Knauf Group is investing €200 million in plants in Romania including our new site in Târnăveni.

Joining forces for change

Knauf Insulation joined forces with Daikin, Danfoss, Rockwool, Saint-Gobain, Signify and Velux to sign a memorandum that commits the companies to collaborate and allocate resources to ensure building energy efficiency drives policies in Central and Eastern Europe. The memorandum was signed at the Central and Eastern European Energy Forum (C4E) where delegates stressed the importance of advocacy to unlock funding to renovate the region's 30 million energy inefficient buildings.

TRANSFORM CITIES FROM GREY TO GREEN

Our Public Affairs teams have been campaigning to put green infrastructure and green spaces at the heart of Europe's urban centres.

Throughout 2023, working with the European Chapter of the World Green Infrastructure Network, we have been calling on policymakers to be more ambitious in terms of mandating green roofs and walls for new and renovated buildings, increasing green spaces in urban centres and maximising the potential of green infrastructure to manage stormwater.

REDUCE FLOODING

Challenge: Outdated combined sewerage-stormwater systems are under increasing pressure as populations grow and storms become more intense, flooding becomes common and impervious urban surfaces replace water-absorbing green spaces causing massive sewage overflows and water run-off during heavy rainfall.

Solution: Green infrastructure can help restore the natural water balance cycle by absorbing stormwater when the rain touches the ground and allowing it to evaporate rather than causing flooding. In turn, the ability to capture vast volumes of stormwater takes pressure off sewerage systems preventing pollution due to overflows and saves energy by reducing the need for water treatment facilities to run at full capacity.

Action: We are urging policymakers to introduce more green infrastructure to urban areas through the revision of the European Urban Waste Water Treatment Directive (UWWTD).

SAVE ENERGY

Challenge: Buildings in Europe are responsible for 36% of emissions and 40% of energy consumption. Following the invasion of Ukraine, energy security is top of policy agendas.

Solution: Green roofs and walls are natural carbon sinks with one square metre of green roof capable of absorbing the same quantity of CO_2 every year as a car would emit during an 80km drive. Green infrastructure also provides outstanding energy-saving insulation and cools the air around buildings reducing urban heat island effect. Green roofs also complement the installation of photovoltaic panels which work more effectively in cool microclimates.

Action: We have consistently campaigned policymakers to mandate the installation of green infrastructure on new buildings and during major building renovation projects through the Energy Performance of Buildings Directive (EPBD).

SUPPORT NATURE

Challenge: Pollution, climate change, habitat loss and invasive species are destroying natural ecosystems. The European Union says 80% of Europe's habitats are in poor condition significantly impacting biodiversity and reducing wildlife populations by an average of 69%.

Solution: Green infrastructure transforms urban environments, supports the restoration of natural habitats and the return of biodiversity, reduces noise, water and air pollution and provides places that improve our physical and mental health.

Action: We have been calling on policymakers to introduce ambitious and enforceable urban greening targets through the Nature Restoration Law to deliver "healthier, wealthier and more beautiful cities for generations to come".

Pictures taken from the BBC's Spaces That Shape Us featuring our Urbanscape green roof installed at a school in Slovenia

FAST-TRACK CARBON PAYBACK

The average environmental payback time of our Mineral Wool solutions is only 95 days.

This means that, on average, in just over three months of our solutions being installed in a building, the carbon savings from reduced heating energy demand is equivalent to the emissions generated during their manufacture.

After those 95 days it is all benefit for the planet.

Using research commissioned from the Ramboll consultancy, our new Knauf Insulation Carbon Saving Calculator also reveals that Knauf Insulation products sold in 2022 in Europe contributed annual savings of 17.8 TWh of heating energy — the equivalent of 20% of the annual consumption of electricity in Belgium. Similarly, our products save 3.6 Mtons of CO_2 every year, representing 20% of the total annual emissions of Slovenia.

The tool was created to showcase how our Mineral Wool contributes to reducing operational carbon from heating in buildings as well as providing us with the insight we need to shape our decarbonisation strategy.

ON AVERAGE IN JUST

95 days

OUR MINERAL WOOL SOLUTIONS ACHIEVE ENVIRONMENTAL PAYBACK

"For many years our colleagues worked on calculation tools to assess how much carbon Knauf Insulation products save when in use. However, results varied due to different hypotheses. That is why it was time to create a unique tool and method that would apply to all countries."

Vincent Briard | Knauf Insulation's Sustainable Building and Partnerships Director

To achieve the European Union's ambition to be carbon neutral by 2050 it is essential to tackle Whole Life Carbon (WLC) in the construction sector, this means cutting the carbon during the operational stage of a building, particularly from heating, and reducing the carbon embodied in building materials.

We know our solutions make a huge positive contribution to cutting operational carbon, but to manufacture these products is a carbon intensive process. That is why we have set a goal to reduce the embodied carbon of our solutions by 15% by 2025.

There are inevitably big questions, such as how do these positive and negative impacts balance out? And what measures can we take to make sure Knauf Insulation makes an even greater impact to decarbonisation in future?

To provide answers we created a robust calculating tool to support our strategy using research commissioned by Ramboll which has been studying WLC for the European Commission.

The research examined factors that influence operational carbon from heating energy demand in 13 sets of countries which were representative of the whole of Europe.

In each 'set' the focus was on specific climatic conditions, energy performance requirements, type of construction – new or renovation – and the carbon emission intensity of the countries' heating energy mix (the balance between fossil fuels and renewables).

To calculate the positive (use stage) and negative (manufacturing stage) carbon impact of our solutions, we provided data for 2022 sales of our products that contribute to the building envelope in each region to reveal both their embodied carbon and the contribution they made to heating energy saving in buildings.*

By feeding this data into our calculator tool we can now demonstrate how our solutions reduce operational carbon in buildings at a much greater scale than their emissions during manufacturing.

Equally significant, the tool helps us benchmark our objective of improving the ratio of carbon savings achieved by our products over their lifetime compared to the embodied emissions we generate during their manufacture.

This is an important incentive for us to stay ahead of the game and move faster than the pace of decarbonisation in Europe.

* The approach to the research was conservative as calculations did not include insulation's impact on saving cooling energy.

IMPORTANCE OF WHOLE LIFE CARBON

Policymakers, regulation, customers and global organisations such as the World Green Building Council (WorldGBC) are placing increasing emphasis on Whole Life Carbon (WLC) in buildings.

WLC includes the carbon emitted from the energy used to heat and cool a building (operational carbon) and the carbon emissions generated throughout the lifecycle of building materials from the cradle to the grave (embodied carbon).

As understanding of WLC becomes more widespread, the WorldGBC European Network has successfully initiated a project where National Green Building Councils are creating Decarbonisation Roadmaps.

Already 10 have been completed and more are in the pipeline, bringing together construction industry stakeholders and national policymakers to explore exciting future opportunities and challenges.

In some countries, WLC regulation is already in place. In France, for example, it has been mandatory to provide information about embodied and operational carbon for all new buildings since January 1, 2022, and to remain below maximum target values. The same regulation has been in place in Denmark since January 1, 2023.

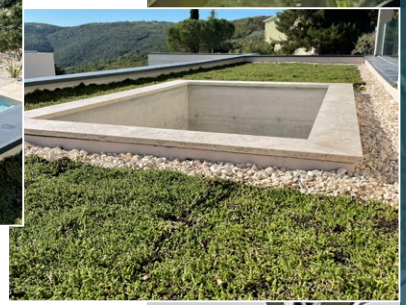
Meanwhile, in the revision of the Energy Performance of Buildings Directive, the European Commission has proposed that the carbon footprint of new buildings is reported enabling the creation of future targets.

In addition, a European Union-wide WLC roadmap was set to be released at the beginning of 2024 by the Commission featuring milestones for operational and embodied carbon until 2050. The roadmap is based on findings from a study by consultancy Ramboll, the Building Performance Institute Europe and KU Leuven University.

This research found that construction sector WLC accounts for 41% of total EU emissions. In European Union building stock in 2020, 21% of emissions were embodied while the remaining 79% came from operation.

The study demonstrated that by 2050, based on the selected scenario, this building stock would decarbonise by more than 68% compared to 2020, with embodied carbon becoming far more important representing more than 70% of WLC.

For Knauf Insulation, reducing energy consumption and operational carbon remains our priority focus as it still represents the bulk of WLC. However, reducing embodied carbon is an essential next step.



A total of 80m² of carbon-absorbing Urbanscape® Green Roof was installed at this villa in Rabac, Croatia

CONSTRUCTION SECTOR WHOLE LIFE CARBON ACCOUNTS FOR **41%** OF TOTAL EU EMISSIONS

Enabling informed environmental choices

We created our Knauf Insulation EcoIndex and Carbon Calculator to have informed discussions with customers to provide them with the insight they need to compare the embodied environmental impact of different construction solutions as well as different systems with several product components.

The tool distils a vast amount of data from independently verified Environmental Product Declarations (EPDs) – which forensically examine the lifecycle of our products from the cradle to the grave – into an easily digestible index which allows customers to make informed choices about the products they choose.

The EcoIndex and Carbon Calculator has been used in several countries to support our customers such as specifiers and architects.

For example, the EcoIndex is already being used for the analysis of our OEM portfolio and we have identified key parameters where we can make an impact in terms of carbon footprint in our Lifecycle Assessments.

Our Technical Solutions and Green Solutions will also benefit from EcoIndex analysis, and the tool will be used extensively to help our innovation team develop the solutions of the future.

BUILDINGS FIT FOR THE FUTURE

Our Illange plant in France where our offices have been awarded the level of 'high performance' by the independent Green Building System Haute Qualité Environnementale (HQE)

As well as campaigning for efficient, safer, sustainable buildings, we are also working to make our own buildings fit for the future.

In France, our Illange plant offices were certified by the independent Green Building System Haute Qualité Environnementale (HQE) in 2023. The certification followed more than a year of teamwork to ensure the plant was awarded the level of *très performant* (high performance) for quality of life, environmental impact and economic performance.

Having learned from the certification of our French site, our Create Better Buildings working group is now examining the best holistic approach for our buildings in terms of new construction and renovation.

For example, our engineering, sustainability and regulatory teams have prepared a Knauf Insulation Manufacturing Buildings Standard for new sites setting aligned building quality standards as well as an audit of existing buildings combined with the rebuild projects to highlight priorities.

The next projects in the pipeline are our new Glass Mineral Wool line at our Târnăveni site in Romania, our new Rock Mineral Wool line at Novi Marof in Croatia and our St Helens rebuild and capacity expansion in the UK.

SHOWCASE OF SUSTAINABILITY

Our Knauf Insulation Experience Center (KIEXC) at Škofja Loka in Slovenia was the first building in the country to be certified to the highest DGNB Platinum green building standards as well as being a pilot project that contributed research to the European Commission's Level(s) sustainability initiative.

SPACES THAT SHAPE US

The benefits of deep renovation by Knauf Energy Solutions (KES) and the positive impact of our Urbanscape® green roofs are the focus of two films produced by BBC StoryWorks Commercial Productions in collaboration with Knauf Insulation.

The films are included in a campaign entitled The Spaces That Shape Us, initiated by the World Green Building Council, and launched during Green Building Week in September 2023.

What is the aim of The Spaces That Shape Us?

Buildings have a huge impact on our environment and are responsible for **39% of global emissions**. Buildings also shape our lives as we spend 90% of our time indoors.

Over the course of 10 films, the campaign explores innovative approaches to buildings that not only improve the way we live but also pave the way to a more sustainable future.

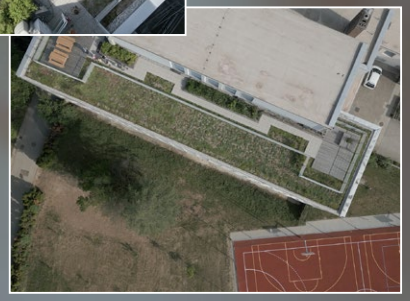
Pictures taken from the Spaces That Shape Us series featuring our Urbanscape green roof installed at a school in Slovenia and a major renovation project by Knauf Energy Solutions in Belgium

Naturally inspired learning

The first film shows how our Urbanscape solution has improved the quality of life for children and teachers at a school in Slovenia by offering them a green space on the school roof.

The green roof provides an innovative outdoor space where pupils can escape to enjoy fresh air lessons, relax together and learn about nature and sustainability.

In terms of the environment, the green roof promotes biodiversity, improves CO_2 absorption and provides effective stormwater management. Green roofs also cool buildings and the summer temperatures of classrooms have dropped since the installation of the roof.



Scan the QR code to watch the film or visit: bit.ly/KI-GreenRoof

Home comfort of renovation

The second film comes from Belgium where Knauf Energy Solutions (KES) has played a key role in the smart renovation of hundreds of social housing units.

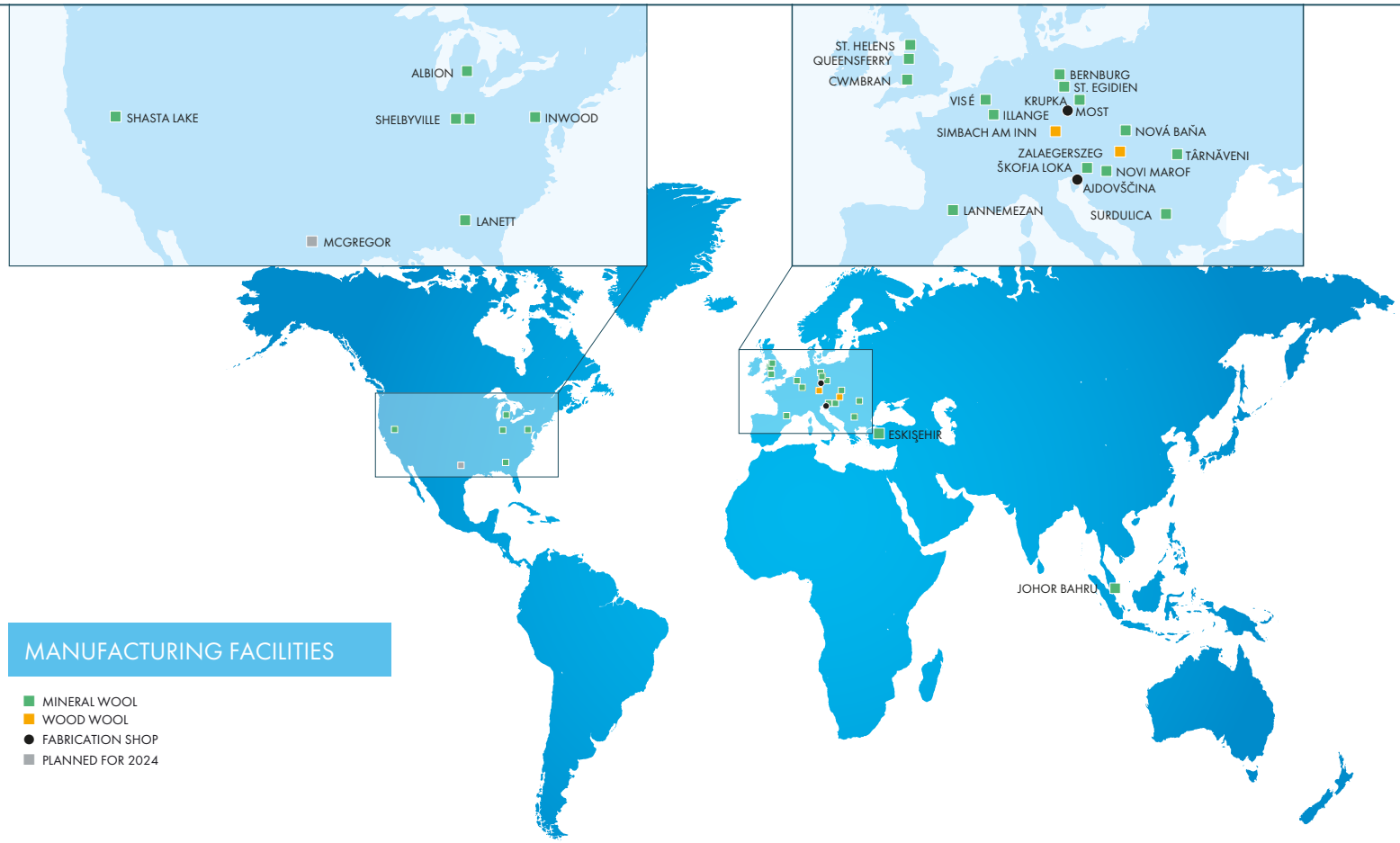
The film focuses on real-life examples of how smart energy-efficient renovation has improved the thermal comfort and well-being of residents and significantly reduced their energy costs.

It also highlights how the carbon footprint of renovation is significantly lower than building a new home from scratch making it the preferred option for the social housing associations featured in the film.

In addition, the KES team also demonstrate the importance of delivering real performance in renovation – real-time, audited energy savings and carbon emission reductions that can be quantified and guaranteed.

Scan the QR code to watch the film or visit: bit.ly/KI-Halle-Belgium

KNAUFINSULATION



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ABOUT KNAUF INSULATION

With more than 40 years of experience in the insulation industry, Knauf Insulation represents one of the fastest growing and most respected names in insulation worldwide.

Knauf Insulation is committed to helping its customers to meet the increasing demand for energy efficiency and sustainability in new and existing homes, non-residential buildings and industrial applications. The company shows a strong and steady financial performance with turnover exceeding €2.5 billion. Knauf Insulation currently has nearly 6,000 employees in more than 40 countries and 27 manufacturing sites in 14 countries.

OUR MISSION

Our mission is to challenge conventional thinking and create innovative insulation solutions that shape the way we live and build in the future, with care for the people who make them, the people who use them and the world we all depend on.

OUR VISION

We lead the change in smarter insulation solutions **For A Better World**.