

challenge.
create.
care.

KNAUFINSULATION

A man with a beard and safety glasses, wearing an orange high-visibility vest over a dark long-sleeved shirt and dark trousers, is inspecting large rolls of insulation. He is pointing at the insulation with his right hand. The rolls are wrapped in clear plastic and secured with white straps. The background shows a factory environment with yellow structural elements.

Insulation Matters

Annual Review 2019

CONTENTS

- 04 SAFETY: IT'S UP TO US
Importance of culture change
- 06 NEW NORTH AMERICA CEO
Meet Matthew Parrish
- 08 CLIMATE ACTION
Helping vulnerable villagers
- 10 BUILDING RESILIENCE
Future-proofing buildings
- 12 CAMPAIGNS FOR CHANGE
Better policies worldwide
- 14 EFFICIENCY FIRST
Decarbonising buildings
- 16 FUTURE OF URBAN LIFE
Tackling new challenges
- 20 SUSTAINABLE HABITATS
Bees love our green roofs
- 22 MADE IN MILAN
Inspired green buildings
- 24 FIRE SAFETY EXPERTISE
Our focus on customers
- 26 KNAUF ENERGY SOLUTIONS
Revolutionising renovation
- 28 EXPERIENCE CENTERS
Improving product performance
- 30 FEEDBACK FORUM
Customers share insight

- 32 CUSTOMER INNOVATION
Success shaped by anthropology
- 34 PIONEERING IDEAS
Innovation across our company
- 36 DECADE OF SUCCESS
Celebrating ECOSE Technology®
- 38 NEW MALAYSIA PLANT
Shaping our future in Asia-Pacific
- 42 AWARD-WINNING PLANT
Illange is open for business
- 46 CORPORATE SUSTAINABILITY
Aiming high for better results
- 52 CONTINUOUS IMPROVEMENT
Positive impact on colleagues
- 54 PEOPLE POWER
Our new generation of graduates
- 56 WOMEN ENGINEERS
Advice from engineering's frontline
- 58 NEWS
Contributing to our communities

Knauf Insulation Rock Mineral Wool DP6 (NaturBoard Timber) slabs were installed in Milan's iconic Bosco Verticale (page 22)

On the cover: Jonathan Boulanger carries out checks of Knauf Insulation Glass Mineral Wool at our Visé plant in Belgium

AN OUTSTANDING YEAR

Welcome to our new annual review — a celebration of an extraordinary chapter in Knauf Insulation's history.

In 2019 we saw the launch of our €110 million plant at Illange in France (page 42), started the countdown to our new site in Malaysia in 2020 (page 38) and a new President and CEO was appointed to Knauf Insulation North America — a very warm welcome to Matthew Parrish (page 6).

Around the world we campaigned for a more sustainable urban environment (page 12), continued developing innovations to make buildings more resilient such as Knauf Energy Solutions (page 26) or our new Knauf Insulation Experience Centers (page 28) and helped create new homes for a remote Alaskan community that is being forced to move as result of climate change (page 8).

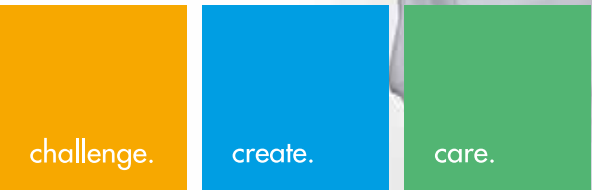
Customers continue to be at the heart of everything we do. We have stepped up our building fire safety support for customers (page 24), focused on installers' needs through our new Captain K partner program and even introduced anthropological studies on construction sites to serve customers better (page 32).

Most significantly, we have built on our sustainability successes and continued to reduce energy use, carbon emissions, waste to landfill and Lost Time Accidents despite a record-breaking year of production (page 46).

However, sustainability is a journey and we are continuously improving, finding new ways to minimise our environmental impact and, critically, achieve the behaviour change that results in zero harm (page 5).

Finally, I was delighted that in 2018, Knauf Insulation was voted the Global Insulation Company of the Year. Then, in 2019, there were three more reasons to be proud of our work when we were presented with Global Awards for best plant; best innovation and insulation personality of the year (page 59). 2020 has a lot to live up to. And a lot to look forward to.

Jean-Claude Carlin,
Group CEO, Knauf Insulation



OUR SAFETY: IT'S UP TO US

Jean-Claude Carlin, Group CEO, Knauf Insulation, has made safety his key priority. 'I will not be satisfied until we achieve zero harm every day at every site. We all have to take responsibility for our safety.'

In 2010 Knauf Insulation set a target to reduce Lost Time Accidents (LTA) by 50% by 2020. This has been achieved and in 2018 our LTA figure was down to 48%. The next stage in our journey is to focus on learning how to change — and model — safe behaviour, says Jean-Claude Carlin, Group CEO, Knauf Insulation.

To what extent are you pleased with the reduction in LTAs?

I'm pleased we accomplished what we promised. But it's not good enough. I will not be satisfied until we achieve zero harm every day at every site. We all have to take responsibility for our safety.

How will this be achieved?

More than 90% of accidents are behaviour related. It is critical that we all speak up if we see anyone acting in an unsafe way whether it is a friend at work or the boss. By challenging leaders and challenging ourselves to be better we change our culture and put safety first.

How can colleagues become better safety role models?

Telling someone to change their behaviour might seem like a challenge, but it is not. It shows care. Sometimes people don't even know there is a better way to do something.

Even if there is an impact on production?

Absolutely. Safety cannot be compromised by a view that 'output is king'. We must never forget that every



CEO Jean-Claude Carlin discusses safety at our new plant in Illange

accident has an impact on that person's family, friends, community and future.

What initiatives have been introduced to change behaviour?

Observation visits to sites by senior management have helped sharpen our focus on safety and our support for World Day for Safety and Health at Work is an opportunity to hold workshops, behaviour sessions, first aid courses and drills, but changing behaviour is critical. And that is why we introduced safety time-outs and issued Stop cards to everyone.

Why are these cards significant?

Each card states: 'You have the responsibility and authority to stop unsafe actions.' We are giving everyone permission to keep us safe. We have enough rules and processes. We need to look at the way we behave and the way we behave to others. We can do better.

We all have a role to play.

Of course. I want to come home safely to my family. Everyone wants to come home safely. Nothing is so important that it cannot be done safely.

'WE DON'T NEED MORE RULES'

"Starting with the finding that more risks don't always lead to more accidents and more rules don't drastically reduce accident numbers, we've found what we need is behaviour change," says Philippe Coune, Group Environmental and Western Europe Regional HSE Manager. "Working with the French National Centre for Scientific Research we have held workshops in Knauf Insulation Western Europe to look at the psychological aspects of decision processes that could lead to unsafe behaviour. We learnt about influencing positive behaviour, encouraging safer attitudes, community engagement and 'nudging' behaviour change. Our aim is not more rules, it's people creating their own safe environment."

Lock Out Tag Out (LOTO) at our Illange plant. The procedure ensures machines are properly shut off and cannot be restarted during maintenance or repairs

MIND SUPPORT

Knauf Insulation in the UK has signed the 'Time to Change' pledge — a social movement to tackle the stigma surrounding mental health issues at work. Mental health training has been delivered to all those with line management responsibility to create open 'tea and talk' environments to discuss mental health issues. We are also working with the mental health charity MIND to raise funds and awareness. In 2019, MIND was one of our two corporate charities in the UK. The other was CRASH, the construction industry charity.

Vision of ambition

Putting safety first, empowering our colleagues through continuous improvement and ensuring we are indispensable to customers are the top three priorities of our new President and CEO at Knauf Insulation North America, Matthew Parrish.

Matthew Parrish was appointed the President and CEO at Knauf Insulation North America (KINA) in 2019 following two years as our Vice President of Residential and Light Commercial Sales. He has been in the construction industry for 30 years — nine of which have been spent in insulation.

Why are you the right person for the job?

I've three decades of experience in leadership and providing customer-centric solutions and I'm 100% committed to making Knauf Insulation the greatest company for our employees. The company has enjoyed great success and I want to build on this to ensure we are the best partner for our customers.

What was your priority when you were first appointed?

In my first 90 days I met as many of our customers and employees as possible to understand the opportunities for all of us. In recent years, we have spent a lot of time focusing on our people and operations and we are now in a position to take our customer focus to a whole new level.

What do you see as key challenges?

Our challenge is to maintain the positive gap between us and our competitors and that means continuously finding new ways to develop and empower our colleagues. It's not about one person or five, it's about the 1,600 people that work for Knauf Insulation North America that will make us even more successful.

What will success look like a year after your appointment?

First, not a single employee will have been injured. Second, we will have exceeded all our financial and non-financial key performance indicators. And, finally, our customers will tell us that they cannot imagine doing business with any other company besides Knauf Insulation.

How will you put customers at the heart of everything we do at KINA?

This starts by changing the mindset of being a sales function to something everyone in the organisation actually owns. We are starting with assembling

a customer advocacy team of cross-functional employees to look at all the touchpoints with our customers.

How do you model and improve safe behaviour?

All the technology and state-of-the-art personal protection equipment isn't a guarantee to keep employees safe. It really comes down to individual decisions and behaviours. A large part of this is education and awareness. For example, at KINA, we have implemented a safety observation system that engages more employees in the process for creating a safer environment. Ultimately we want to see our employees transfer our safety culture to their homes.

You speak about empowering employees. What does this mean? And what does empowerment look like to you?

This really speaks to one of our Values 'Entrepreneurship'. We want our employees to own the business.

Are there any continuous improvement initiatives you want highlight in KINA?

We are driving continuous improvement throughout our organisation but this isn't limited to manufacturing. For example, one of our focus areas is customer-centricity and driving higher customer satisfaction scores.

Are there any new initiatives that have been implemented to improve the sustainability of KINA?

As we look for ways to reduce waste, we are recycling fibre residue back into a secondary blowing wool product.

Any other key areas of focus that are significant?

Another critical area of focus for KINA is driving higher levels of employee engagement. This is being accomplished by creating an environment that motivates employees to be more engaged. I truly believe companies with high levels of employee engagement are highly successful. We have started this journey through employee engagement surveys and focus groups.

PERSONAL INSIGHT

Best advice: If you think the grass is greener on the other side, water your grass.

Growing up: I grew up on a large farm in Missouri, went to college at the University of Missouri and then went right into the building materials industry and spent most of my career there.

A NEW HOME FOR NEWTOK

Knauf Insulation North America is supporting the Cold Climate Housing Research Center to help build new energy-efficient homes for a community of Native Alaskan villagers that has been forced to relocate due to climate change.

Along the southwestern Alaskan coast, in the Yukon-Kuskokwim Delta, is a remote village called Newtok. The 375 people there value their traditional lifestyle of hunting, fishing and foraging for food, and the only modes of transport are boats, snowmobiles and all-terrain vehicles. There are no roads — just boardwalks between the school, post office and homes. The villagers, known as the Yu'pik, have created a strong identity based on their self-sufficient lifestyle.

Unlike many other rural Alaskan villages, the population of Newtok is growing. But as the population grows, the community's land is rapidly disappearing. Due to severe erosion, the Ningliq River is closing in on the village at a rate of 22 metres a year, causing harsh flooding and threatening the residents' health and safety. Erosion is a naturally occurring process, but because of the rapid loss of permafrost, the rate at which it is happening in Newtok is anything but natural.

“The story of Newtok is a sobering reminder of the dire need for sustainable solutions. It's also a story of hope and perseverance that shows the power of people who come together for a common purpose.”

Rick Blumenthal, Technical Building Science Specialist, Knauf Insulation

VICTIMS OF CLIMATE CHANGE

Trouble began in 1996, when extreme flooding and sinking ground caused the Newtok River to be taken over and diverted by the Ningliq River and turned into a swamp. Nearly overnight, the village became susceptible to storm surges and erosion. Commercial boats could no longer reach the village and waste that was dumped into the river stopped flowing away and began to pile up at the crumbling coastline. And, as storm seasons grew longer and harsher, tide levels rose and started to spread contaminated water throughout the village.

Now the community is in the final sprint of

what has been a decades-long process to move to a new, permanent location on higher, more stable land: Mertarvik. All the while, the residents have watched their land be eroded by the water, metre by metre. In a matter of months, homes could be lost. Time has almost run out. The new location, Mertarvik, is 14 kilometres upriver from Newtok on the volcanic bluffs of Nelson Island.

TRAINING INSTALLERS

Securing funding for the project has been a challenge. The community has seen investments from federal and state agencies, but they have fallen short of the funds needed to build new homes in Mertarvik.

However, Newtok has also had help from non-profits such as the Cold Climate Housing Research Center. The CCHRC was contracted to provide the design,

“Alaska is on the edge of a cliff dealing with the climatic wave in the north. People in Newtok are losing the ground they walk on. This has necessitated a move 10 miles away and the building of a new village. Partners like Knauf Insulation contributing both material and installation expertise in an extreme environment is deeply appreciated by all of us.”

Jack Hébert, CEO, Cold Climate Housing Research Center

verification and testing for the homes on Mertarvik — durable, high-performance houses made with healthier, more sustainable materials and systems.

The Knauf Insulation team consulted with CCHRC to help develop a plan for insulating the new homes in Mertarvik and recommended using Jetstream® Blowing Wool. The builders for Mertarvik have in-house carpenters, plumbers and electricians — but no insulating staff. Knauf Insulation trained installers and worked on-site with crews to ensure the insulation was installed to deliver the best performance.

The Mertarvik homes are built with ‘mono-trusses’ — self-contained, complete gable frames that maximise

energy efficiency and shipping efficiency to remote job sites. The roof, walls and floors are all one piece and made of open-web trusses, to help prevent thermal bridging once insulated. Construction materials are selected to be resilient to wind, ice, snow and rain, and to be as low maintenance as possible.

MONITORING PERFORMANCE

Knauf Insulation also sponsored the installation of sensors in the walls of each house to monitor temperature, moisture and humidity for two years. The goal is to extract comprehensive data on the performance of our Glass Mineral Wool system in one of the harshest climates on the planet.



FUTURE-PROOF BUILDINGS

Climate change, CO₂ emissions, extreme weather, unsustainable energy use, over-populated urban areas, changing demographics and a need for a healthier urban environment are among the most pressing issues of the 21st century. Buildings have to become more resilient and Knauf Insulation can help. Here's how:



EMISSIONS AND ENERGY USE

Challenge: Globally buildings are responsible for 28% of CO₂ emissions. Cities occupy 3% of the world's land but account for up to 80% of energy consumption and 70% of carbon emissions. In Europe buildings are responsible for 36% of emissions and 40% of energy use. Only a third of the world's final energy use is covered by energy efficiency policies, codes and standards.

Our solutions: We campaign around the world to put energy efficiency at the heart of policy agendas (page 12) we want to ensure building savings promised in theory deliver in reality (page 26). And, of course, we produce solutions that contribute to energy savings and the reduction of emissions.



URBAN BOOM

Challenge: Solutions need to be found to tackle unsustainable urbanisation. In Germany, for example, the percentage of people living in urban areas will be 84.3% by 2050. Around the world rapid urbanisation is straining infrastructure as millions more move to towns and cities.

Our solutions: The Knauf Group has joined with construction companies and policy makers to examine solutions (page 12) to create a more flexible urban environment such as manufacturing modular homes in factories and bringing them to cities.

* Mineral Wool refers to Glass Mineral Wool and Rock Mineral Wool products



EXTREME WEATHER

Challenge: The five-year average global temperature from 2013-17 was the highest recorded; the 2017 hurricane season was the most costly on record and the number of floods and storms are soaring. Weather is impacting the urban environment putting water systems under pressure.

Our solutions: Our Urbanscape Green Roofs save energy, absorb CO₂ emissions and air pollutants, reduce building heat-island effect and contribute to urban water management (page 19). We are campaigning for legislative measures to increase the uptake of urban green infrastructure in Europe (page 13).



HEALTH RISKS

Challenge: Nine out of 10 people breathe polluted air; noise pollution is linked to cardiovascular problems and, as we spend 90% of our time indoors, we are exposed to unpleasant Volatile Organic Compounds. In addition, in the European Union for example, 8% of people cannot afford to heat their home when it is cold, creating serious health risks.

Our solutions: Our products help create healthy, comfortable buildings. Our Urbanscape Green Roof solutions absorb air pollutants; our Mineral Wool* with ECOSE Technology® is certified to the highest Eurofins Indoor Air Comfort Gold standards; insulation supported by ventilation keeps buildings dry and mould-free and the fibre composition of our insulation reduces noise pollution. And, of course, insulation contributes to health by providing comfortable interior temperatures when it is hot or cold.



SAFER BUILDINGS

Challenge: As buildings get taller, construction more sophisticated, new building materials introduced and renovation initiatives launched, it is vital that fire safety is factored into every stage of urban development.

Our solutions: We drive campaigns and support organisations to put building fire safety at the heart of all policies. For example, the revised Energy Performance of Buildings Directive states European Union countries can use long-term renovation strategies to address fire safety; we help specifiers navigate regulation and many of our solutions are certified to the highest A1 fire classification (see page 24).



LIMITED RESOURCES

Challenge: In Europe, used material from buildings accounts for between 25-30% of all waste while around 50% of all extracted materials are used in buildings.

Our solutions: Our Glass Mineral Wool with ECOSE Technology uses up to 80% of recycled material; we have a UK facility that transforms 60,000 tonnes of used glass into insulation every year; we promote the recycling of Mineral Wool from buildings being deconstructed; support projects to reuse demolition insulation and helped develop a wall system that uses recycled demolition materials. We are also working on projects to take back delivery pallets and to pick up and recycle customer waste (see page 51).

To learn more about future-proofing our built environment read the latest report by the European Insulation Manufacturers Association Better Buildings for a Better Future at eurima.org

CAMPAIGNING FOR CHANGE

Knauf Insulation campaigns to put energy efficiency, building resilience, green infrastructure and fire safety at the heart of policies worldwide.

NORTH AMERICA

We have campaigned for higher thermal values during revisions of the International Energy Conservation Code across the US. In 2018, with our partners, we established minimum envelope levels which were 15% more efficient than proposed changes.

New opportunities

From our public affairs bases across Eastern Europe we are examining ways to generate greater awareness of stronger building energy efficiency regulation in the United Arab Emirates, Turkey, Greece, Bulgaria, Romania, Serbia and Hungary. The low-level of codes in these countries offers huge potential. Ambitious regulation to improve U-values and the pace of renovation would generate huge cost savings, provide enormous social and economic benefits as well as boost the contribution these countries make to curbing emissions.



UK

The Government has committed to net zero by 2050 with a reduction in emissions in new homes playing a lead role in that ambition as part of a proposed Future Homes Standard 2025. We are campaigning for a 'real performance' element to be central to the proposed standard with a focus on 'learning' how to build to real performance targets for housebuilders in the interim.



GERMANY

The Knauf Group is working with partners to find solutions to unsustainable urbanisation, high house prices and a lack of affordable housing such as adding 1.1 million new lightweight apartments to the top of 580,000 city buildings or providing modular affordable homes built off-site and located in designated areas.



FRANCE

We are supporting France's plans to make 500,000 homes energy efficient annually to tackle fuel poverty and the national vow to bring all buildings up to low-energy class A-B. Our new Rock Mineral Wool plant in Illange and our Glass Mineral Wool site in Lannemezan, as well as Visé in Belgium, will provide a range of high-performance solutions.



SPAIN

We are campaigning to increase proposed annual renovation rates from 100,000 to more than 250,000 buildings in Spain's Climate Change and Energy draft law and working with policy makers to improve air quality in Andalusian schools. Our General Manager Oscar Del Rio is President of the Iberian Mineral Wool Manufacturers Association which in 2019 marked its 40th anniversary with initiatives highlighting the importance of insulation.



ITALY

We are working to put highly insulated buildings at the top of policy agendas and take a proactive role in energy efficient building campaigns. Our research with Polytechnic of Milan explored how highly efficient buildings can balance peak energy demand, support the full integration of renewables and pave the way towards smart decarbonised cities.



SLOVENIA

Knauf Insulation with representatives from South East Europe signed the 'Ljubljana Declaration' calling for policies to upscale energy efficient building renovation in the region at an event organised by the European Alliance of Companies for Energy Efficiency in Buildings at our Experience Center in Škofja Loka.



EUROPEAN UNION

The revised Environmental Performance of Buildings Directive (EPBD) mandates that Member States must create renovation strategies to decarbonise their building stock. With partner associations we are helping policy makers make these strategies a reality through action plans and strategic guides.



AUSTRALIA

Germany and Australia have set up a new energy efficiency sub-group to drive bilateral collaboration on energy efficiency policy. Our Director Public Affairs Asia-Pacific, Christoph Freiherr von Spesshardt, will chair this group in his role as a vice-chairman of the German Energy Efficiency association (DENEFF). CEO of Australian sister organisation, EEC, Luke Menzel, will represent Australia as chair. Both will work with the Australian Alliance for Energy Productivity, the Energy Transition Hub and German-Australian Chamber of Industry and Commerce, to define an energy efficiency workplan across building, industry and finance sectors.



NEW ZEALAND

We are supporting new laws mandating ceiling and under-floor insulation in the country's estimated 600,000 rental properties, as well as backing a NZ\$142 million government investment to improve the insulation and heating of 52,000 low-income owner-occupier homes.

Tackling emissions with green cities

With the World Green Infrastructure Network (WGIN) we are campaigning for ambitious green infrastructure initiatives and regulations in the European Union and beyond. Green infrastructures and natural based solutions can address major issues such as water management in urban areas, climate change, air pollution and lack of biodiversity. The European Union's long-term emissions reduction vision listed green infrastructure as "one of the overriding priorities guiding the transition to a climate change neutral Europe". "Green infrastructure can deliver adaptation benefits and absorb emissions and pollution," says the European Commission.

LEADERSHIP RECOGNITION

Knauf Insulation was awarded the Greenbuild Leadership Award by the US Green Building Council in 2019. Mahesh Ramanujam, President and CEO of USGBC and Green Business Certification, Inc (GBCI), pictured left, said: "Knauf Insulation's commitment to improving the quality of life is an inspiration. This award recognises your outstanding contributions to positively affect the lives of people today and tomorrow." Receiving the award, centre, is Vincent Briard, Knauf Insulation's Director of Sustainability



"We understand the need to tackle embodied carbon emissions. However, we must first focus on energy performance and that means creating a more resilient building envelope."

Vincent Briard, Knauf Insulation's Director of Sustainability

EFFICIENCY FIRST

Buildings are responsible for 39% of CO₂ emissions globally and the sustainable building debate has put the issue of embodied carbon — carbon emissions associated with materials and construction processes throughout the whole lifecycle — in the spotlight.

Vincent Briard, Knauf Insulation's Director of Sustainability, says: "In a building constructed in 2010, for example, operational carbon (emissions from heating and cooling) would account for 75% while embodied carbon from construction and materials accounts for 25%. We understand the need to tackle embodied carbon emissions. However, we must — first and foremost — focus on energy performance and that means creating a more resilient building envelope.

Energy efficiency must always take first place in the race to decarbonise buildings.

"Installing insulation, double glazing and a more efficient boiler adds embodied carbon to a building. Over the course of their lifetime, and depending on their application and location, the impact of these elements on reducing emissions will be many hundreds of times higher than the embodied carbon generated during their creation.

OUR SUSTAINABLE PRODUCTION

Knauf Insulation has an in-depth understanding of embodied carbon and has always made it a key priority. Most of our products come with Life Cycle Assessments and Environmental Product

Declarations which transparently identify their environmental impact from the cradle to the grave. And, of course, we are also looking at ways to be more sustainable in our own production processes. Since 2010 we have reduced our CO₂ emissions by over 20% across the company and we are reducing the environmental impact of our products.

We already produce a wide range of solutions with low embodied carbon such as our Glass Mineral Wool with ECOSE Technology® which is created from up to 80% recycled glass. And our commitment to progressively move to ECOSE Technology for our Rock Mineral

Wool ranges will lower the environmental impact of these products as well.

However, as a starting point, we have always called for an energy efficiency first approach to buildings while working with European policy makers in the context of the European Union's vision of a 2050 carbon neutral built environment and Paris Climate commitments underpinned by revised building directives.

'NEED TO GET THE SEQUENCE RIGHT'

In 2019, the World Green Building Council published a position paper that called for all new buildings, infrastructure and renovations to have at least 40% less embodied carbon and be net zero operational carbon, by 2030.

And by 2050, new buildings, infrastructure and renovations are to be net zero embodied carbon, and all buildings,

including existing buildings, must be net zero operational carbon.

"Knauf Insulation supports this ambitious plan, but we absolutely need to get the sequence right," says Vincent. "First, we must tackle the biggest carbon source which is operational energy. This means reducing demand through high performing building envelopes, selecting the right set of equipment and control systems, then using renewable energy.

"At the same time, through an iterative process, we should consider embodied carbon already in the design phase of the building. This means the right building solutions and products with low environmental footprint. By applying such a method, we are pushing forward circular economy and completely in line with the principle of Level(s), the EU Commission sustainable building assessment tool."

KNAUF INSULATION'S CERTIFIED BUILDINGS

Our **plant offices in Illange**, France, are undergoing certification by HQE, the French Green Building Rating Scheme as well as OsmoZ which places emphasis on the health of building users.

In Malaysia, our **Johor Bahru** plant aims to obtain the Malaysia Green Building Index (GBI) certification, and our Shelbyville headquarters in the US is certified LEED Gold.

The **Knauf Insulation Experience Center** at Škofja Loka in Slovenia has been awarded Platinum DGNB certification, is contributing research to the European Commission's Level(s) assessment initiative and has been certified by the green scheme Active House.

In other buildings where we are based, our **Brussels offices** in Belgium are certified to BREEAM Very Good, our offices in **Sweden** are certified to LEED Gold while our **Prague office** is certified LEED-EBOM.

EUROPEAN FIRST

Our Urbanscape Rock Mineral Wool was the first material in Europe to be certified by the new European version of DECLARE — a product label that demands all product 'ingredients' and related risks must be transparently revealed.

The move is important because DECLARE is used by Green Building Rating Schemes such as Living Building Challenge, WELL and LEED to demonstrate a product's transparency. The label previously only used an American version of ingredient codes, known as CAS registry numbers, to disclose the full composition of a product including any 'Red List chemicals' that may be potentially harmful to health.

Now, for Europe, following campaigning by Knauf Insulation, European Chemical Agency codes (EC codes through REACH regulation) are recognised by the DECLARE standard for product transparency.

PASSIVHAUS SYSTEM

Our new light façade system in Spain has been certified to Passivhaus Institut standards for Mediterranean weather. The system provides U-values (including thermal bridges) of 0.25UM (W/m²K), effective air-tightness, acoustic and thermal performance and is certified to Euroclass A1 for non-combustibility and A+ for interior air quality.

10 WAYS TO BUILD A SUSTAINABLE URBAN FUTURE

Knauf Insulation is committed to future-proofing the built environment by making it more sustainable in terms of energy efficiency, resource use, climate resilience, healthier buildings and urban green infrastructure. This means challenging regulation, creating market drivers, ensuring real performance and unlocking resources to make it possible.

1. CHANGE POLICIES

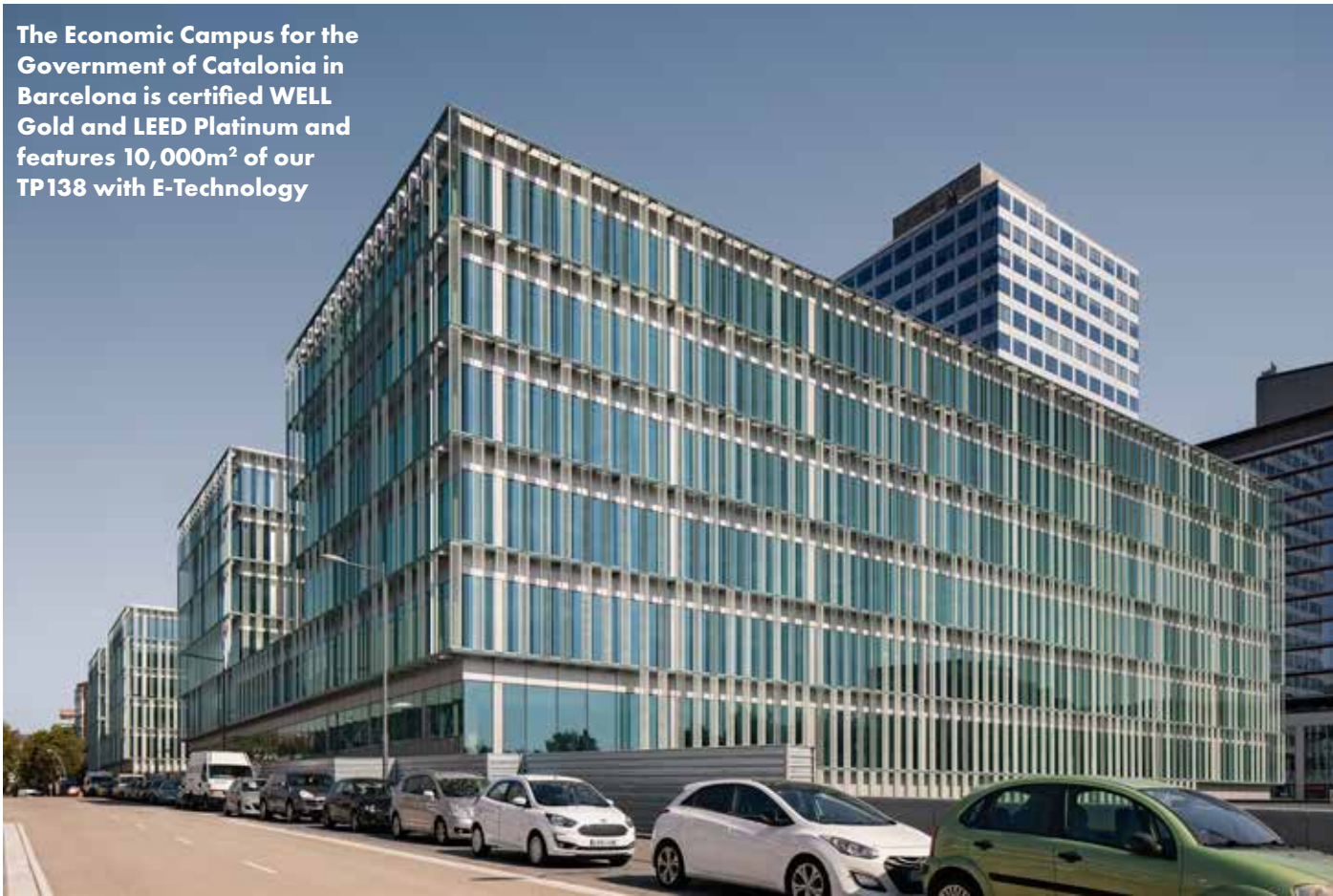
Regulation drives change yet only one third of the world's final energy use is covered by energy efficiency policies. The revised Energy Performance of Buildings Directive (EPBD) came into force in 2018 for European Union Member States and offers a great example for other countries.

Under the directive, which already sets standards for energy efficiency in new and existing buildings, each country must create a long-term renovation strategy to decarbonise its national building stock and to transform existing buildings into near-zero energy by 2050.

Countries also committed to near-zero new build by the end of 2020. Katarzyna Wardal, our European Union Public Affairs Manager, says: "The directive is a powerful driver because these strategies cannot be empty promises. The EPBD requires milestone dates every decade to measure the success of policies with clear goals that are future proof as well as 'trigger points' to accelerate renovation. With partners, Knauf Insulation played a role in the revision of this directive and we are now helping policy makers implement renovation strategies."

Milan's Libeskind Tower, far left, features Knauf Insulation Rock Mineral Wool NaturBoard Timber with ECOSE Technology®. It is under certification with a minimum target of LEED NC GOLD

The Economic Campus for the Government of Catalonia in Barcelona is certified WELL Gold and LEED Platinum and features 10,000m² of our TP138 with E-Technology



“Ensuring resilience? First, materials have to be installed properly. Second, they have to perform as predicted.”

Steven Heath, Technical and Strategy Director, Knauf Insulation Northern Europe

2. SHARE THE BEST EXPERTISE

Scaling up renovation rates? Quantifying benefits? Creating policies that work? Where do policy-makers start? And how do they engage people? Knauf Insulation is a member of the European Alliance of Companies for Energy Efficiency in Buildings (EuroACE) which published a guide to address these issues in 2019. Recommendations include creating well-resourced departments dedicated to the EPBD; constant structured stakeholder engagement; linking the 2030 and 2040 milestones to renovation strategies; benchmarking progress using measurable indicators; introducing renovation passports; sharing data and using public money to de-risk investment.

3. HIGHLIGHT WHAT REALLY MATTERS

A near-zero energy use built environment will reduce energy use and curb CO₂ emissions, but it is vital everyone understands the benefits to society, the economy and to public health. A 2019 report by the Building Performance Institute highlighted how EU-wide renovation initiatives will create jobs, generate increased tax revenue, boost national GDPs, increase property values, cut energy import bills, reduce fuel poverty, improve comfort and productivity, provide air quality improvements — indoors and out — and help everyone pay less for heating and cooling.

4. BOOST RENOVATION RATES

One of the biggest challenges of achieving Europe's near-zero energy use aims for 2050 is stepping up annual rates of renovation from 1% to at least 3%, says the European Insulation Manufacturers Association (EURIMA). In 2019, the association issued an action plan to drive the rate up. In addition to ensuring the delivery of 2030 and 2040 milestones, EURIMA recommendations included: one-stop shops for customers which can provide information about renovation and the finance available; the introduction of building renovation passports and vocational training to improve renovation skills.

5. MAINSTREAM SUSTAINABILITY

The European Commission's pilot initiative Level(s) aims to mainstream building sustainability by unlocking the data needed to understand the environmental impact of buildings across their entire lifecycle. Less than 1% of all buildings are sustainability assessed in Europe. We hope Level(s) will pave the way for an EU-wide Sustainable Performance of Buildings Directive. Our Knauf Insulation Experience Center in Slovenia is supporting Level(s) with research. Josefina Lindblom of the Commission's DG Environment Unit Eco-Innovation and Circular Economy said: “From the beginning Knauf Insulation has supported our Level(s) work and has been extremely thorough.”

6. DELIVER REAL PERFORMANCE

At Knauf Insulation we are focused on ensuring energy savings promised in theory deliver in reality. We are pioneering new processes and digital systems that will ensure energy-saving renovation delivers quality, performance and the savings promised. “We believe our new processes and digital systems

A total of 1,500m² of our Rock Mineral Wool DP5 (NaturBoard Partition Comfort) was installed in these LEED Gold-certified office buildings in Rome



will revolutionise renovation across Europe,” says Barry Lynham, Managing Director, Knauf Energy Solutions (for more details see page 26).

7. BUILD BETTER FROM THE START

Two critical elements are vital to success, says Steven Heath, Technical and Strategy Director, Knauf Insulation Northern Europe. “To create resilient buildings, you must first show all materials and products have been installed properly by qualified installers at the build stage supported by documentary evidence that the work has been done correctly. And secondly, where possible, you must measure that performance to show the building is performing as predicted.”

8. FOCUS ON RESILIENCE

“Buildings are not keeping up with a rapidly changing climate or fast-moving demographics, so we have to make them more adaptable and resilient,” says Ross Holleron, Head of Building Research at Knauf Energy Solutions: “To do that we must examine the interaction between different aspects of a building from design and specification to construction and operation to maximise future value.” To tackle these issues our researchers are exploring how adapting a systems approach to buildings design can avoid future problems. “For example, we are examining the impact of human behaviour, how buildings interact with their surroundings and how the building envelope can be improved to function better,” says Ross.

9. GO FROM GREY TO GREEN

Heatwaves and flooding can cause chaos for urban areas as extreme weather become more common. Green urban infrastructure makes a difference. For example, in the Middle

“Buildings are not keeping up with a rapidly changing climate — we have to make them more adaptable.”

Ross Holleron, Head of Building Research, Knauf Energy Solutions

East where temperatures reach 50°C, installing our Urbanscape Green Roof solution to create a 3,300m² park reduced the amount of irrigation water required from 43,000 litres to 23,000. “In areas where storm-water flooding is common, green roofs can also relieve pressure from overstretched city drainage systems by absorbing up to 70% of rainfall,” says Jure Sumi, Business Development Director Green Solutions. “Our Urbanscape system for example, can hold between 27 and 45 litres of water per square metre.”

10. UNLOCK MORE MONEY

Any policy of renovation has to be supported by funding. To fill the €130 billion per year investment gap for energy efficiency in Europe's buildings, we have been campaigning with partners such as the European Alliance to Save Energy and the European Insulation Manufacturers Association to ensure: funds from the post-2020 EU budget are allocated to support long-term renovation strategies; a dedicated EU-wide renovation programme is set up supported by InvestEU – the EU's hub for innovation and sustainable projects – to inspire additional investments; funds raised from the EU Emissions Trading System and Modernisation Fund are used for the least energy-efficient buildings to overcome energy poverty.

NEW URBAN HABITATS

A new study examines how our Urbanscape Green Roofs can make a healthy contribution to the eco-system by supporting insect pollinators such as butterflies and honey bees.

PROVIDING NATURAL INSPIRATION

Knauf Insulation is carrying out critical research into how our Urbanscape Green Roofs can play an important role in helping to sustain insect pollinators and allow them to flourish.

Pollinating insects such as bees and butterflies are vital to a healthy ecosystem but one in 10 are on the verge of extinction with serious implications for the plant

species that depend on them for pollination.

Initial results from our research carried out by Green Solutions with Slovenia's National Institute of Biology found that flowering green roofs have a high density of pollinators. There were up to 11 pollinators per square metre, including honey bees, wild bees, hoverflies, butterflies and other insects, revealing how

green roofs not only revitalise urban or industrial areas but also mitigate the loss of urban green spaces by providing new pollinator habitats.

The findings are in line with the European Union Pollinators Initiative which aims to encourage wide-ranging new measures to improve the natural conditions needed to sustain thriving pollinator habitats.

**A bee explores our
Urbanscape Green Roof
at Škofja Loka, Slovenia**

Picture: Danilo Bevk,
National Institute of Biology

Made in Milan

Italy's most dynamic city has become a showcase for dramatic sustainable building – Knauf Insulation is playing an exciting role in this Italian renaissance.

Milan is the Italian capital of sustainable building excellence with the country's most exciting developments transforming the city's skyline.

Among these projects are the 40,000m² Bosco Verticale (Vertical Forest) towers, featuring 800 trees and 20,000 plants, as well as the dramatic curve of the 170 metre-high Libeskind Tower.

Knauf Insulation solutions were chosen for both of these high-profile buildings. In the towers of Bosco Verticale a total of 10,000m² of our Rock Mineral Wool DP6 (NaturBoard Timber) slabs were installed while in Libeskind Tower, 1,000m² of our Rock Mineral Wool NaturBoard Timber with ECOSE Technology® slabs were chosen for the building's awe-inspiring façade. Libeskind Tower is under certification as it is still being built — but a minimum target is LEED NC GOLD — while the stunning Bosco Verticale has been certified LEED NC GOLD.

Francesco Cavicchioli, our Public Affairs and Technical Marketing Manager in Italy, says: "The city has always been seen as the country's capital of commerce, design and fashion, now it is famous for its sustainable buildings."

"A certified building is a win-win for everyone"

"These buildings require the highest standards of sustainability and performance when it comes to energy-saving, fire safety, air quality and acoustic performance and we are proud Knauf Insulation solutions were selected for these iconic towers."

Other developments in Milan that feature our solutions include the renovation of Palazzo San Fedele (LEED GOLD in progress) and the construction of two important towers: Gioia 22 tower (LEED GOLD in progress) and Bonnet Tower (LEED GOLD and WELL in progress).

Milan enjoys a reputation as Italy's green capital with 200 buildings certified or under certification by

Green Building Rating Schemes; areas specifically designated as green districts; 290 bike stations, 3,650 bicycles and 218km of cycle paths as well as 1,000 electric vehicle-charging stations scheduled for 2020.

"Green building and sustainable urban development is a rapidly growing trend in Milan but also across the whole country and we are working very closely with LEED and BREEAM assessors nationwide offering technical support in the management of projects," explains Francesco.

"If you are an investor in buildings and you want to differentiate yourself from the competition there is no better way than adding value through a healthier, energy-saving building that has a lower carbon footprint."

"Ultimately, a certified sustainable building is genuinely a win-win for everyone."

"We're proud our solutions were selected for these iconic towers"

The number of LEED certified/registered for certification buildings in Italy, for example, has now risen to 544, according to Greenwich, a team of Milan-based consultants that works with Knauf Insulation.

In Milan there are 118 LEED projects with a total of 82 other buildings certified or registered according to BREEAM, WELL or the national Green Building Council's own green rating scheme (see story right). With so much sustainable urban development to celebrate, Italy's GBC published a map — with Municipality support — highlighting every 'green building'.

"The map was born out of the desire to show people the evolution of the city and its urban layout allowing them a new perspective on the innovation of new buildings and the renovation of historic buildings," says Giuliano Dall'O, Italy's Green Building Council President.

Our NaturBoard Rock Mineral Wool with ECOSE Technology® in Italy was named Trend of the Year 2019 by Kilmahouse and Polytechnic of Milan. The award recognises companies for minimising the environmental impact of production and anticipating sustainable regulation.

'THE NEW NORMAL'

Knauf Insulation is a Platinum sponsor of Italy's Green Building Council (GBC) map of sustainable buildings in Rome. An image of the 37,300m² LEED Gold-certified 'A and B office buildings' on Via Laurentina — featuring 1,500m² of our Rock Mineral Wool DP5 (NaturBoard Partition Comfort) slabs — is showcased on page 19. The map states: "Green building has become the new normal for the eternal city."

GREEN AMBITION

Knauf Insulation has joined Italy's GBC in line with the company's support of Green Building Councils around the world.

In Italy the council is renowned for its own Green Building Rating Scheme which covers areas such as residential buildings, condominiums, neighbourhood areas and historical buildings (30.1% of Italy's buildings pre-date 1945).

Knauf Insulation supported a technical event by the council in June — From Energy Efficiency to Decarbonisation in Buildings. We are looking forward to playing an active role in council activities.

AWARD HONOUR

Knauf Insulation Italy won the coveted LeFonti Award® for Excellence in Innovation and Communication in Environmental Sustainability. LeFonti Awards celebrate organisations that "demonstrate corporate excellence in innovation, leadership, technological achievement and employee engagement" and are awarded by scientific journalists from 120 countries.

Our award was in recognition of communication implemented to highlight the real performance benefits of ECOSE Technology® and its impeccable environmental credentials.



SHARING FIRE SAFETY EXPERTISE

Knauf Insulation is helping customers navigate the complex world of building fire safety and providing them with the specialist insight to make informed decisions.

Public pressure and high-profile fires such as the devastating blaze at Notre Dame in Paris and the tragedy of Grenfell in London have pushed building fire safety to the top of national and international agendas.

Fire regulations are changing across the world, the European Union is examining issues such as façade fire standards and product regulation while the revised Energy Performance of Buildings Directive, which must be transposed by all EU countries by March 2020, places emphasis on fire safety in building renovation.

Issues involved in making a building fire safe are complex and depend on hundreds of factors ranging from the age of a building, its use and location to its layout, conformity to local regulations and applied construction materials. However, when it comes to fire safety and insulation, we have everything covered at Knauf Insulation.

SUPPORTING CUSTOMERS

Amaya Osácar, Knauf Insulation's Fire Safety Manager, supports our teams and customers. She says: "Customers are concerned about making the correct choices such as have the safest products been specified? How are products and systems tested? Is the building in line with regulation? Standards and regulations are being updated, certification and insurance are challenging and buildings continue to change. At Knauf Insulation we are here to help. We are collecting and maintaining the right data to enable us to support customers and understand their challenges."

PROVIDING INSIGHT

Stephen Smith, Head of Product Management for Knauf Insulation Northern Europe, says: "Development programmes have been organised for our teams to help them support customers make informed choices about fire safe solutions. For example, understanding the importance of reaction to fire classifications which describe the combustibility of a material — whether it will burn or not — from a scale of A to F. We want customers to know how products are tested for these classifications and understand how they would behave in a fire. It is also vital that they understand the impact of substituting one product for another with a different classification."

"At Knauf Insulation we are here to help. We are collecting and maintaining the right data to enable us to support customers and understand their challenges."

Amaya Osácar, Fire Safety Manager, Knauf Insulation

UPSKILLING INSTALLERS

Building products or systems that have been installed incorrectly can undermine building fire safety. To tackle this, we have opened Experience Centers in Slovenia and Belgium to help installers across Western and Eastern Europe maximise the performance of our solutions and ensure they are installed correctly to take full advantage of their building fire safety potential.

DRIVING CHANGE

As well as supporting building fire safety campaigns around the world, Knauf Insulation is a member of Fire Safe Europe (FSEU). A total of 39 new Members of the European Parliament from 22 countries committed to FSEU's #Together4FireSafety pledge campaign to make a difference to the future of building safety. We also support the European Union's Fire Information Exchange Platform (FIEP) which facilitates the exchange of fire safety best practices among Member States.

Future-proofing buildings

Knauf Insulation produces A1 and A2 fire-safe solutions for all building applications including Rock Mineral Wool and Glass Mineral Wool rolls and slabs, Wood Wool boards and panels, insulation for HVAC systems, safety doors and garage panels.

NEW FIRE RISKS

Urban wildfires: Urban development is extending into natural areas putting more buildings at risk of wildfires. US Forest Service researchers have found that this 'wildlife-urban interface' in the US grew by 33% from 1990 to 2010.

Solar panels: There have been reports of fires on domestic roofs, schools and other public buildings involving solar panels. Insurance companies such as AXA have stated that the fire risks of solar panels are not widely understood.

Electric fires: Fire associations urge technology users not to charge mobile, laptop or tablet batteries at high or low temperatures, not to leave devices charging after their charge cycle is complete, never cover charging devices — including power leads — and always use genuine chargers.

June 2019: a dramatic fire at the Warsaw Hub construction site in Poland

Renovation REVOLUTION

At Knauf Energy Solutions we accurately assess the potential of a housing renovation project and maximise its return on investment such as in these homes in Belgium

In 2019 an exciting new company was launched to completely transform the built environment by delivering *real* energy savings and providing *real* performance. Welcome to Knauf Energy Solutions. Renovation will never be the same again.

Digital innovation has changed everything. And it is about to change building renovation forever. Everyone knows energy saving renovation is a good idea. Renovation creates jobs, makes buildings more comfortable, saves energy, cuts emissions and saves money. The challenge has always been to measure the potential savings of a renovation and then deliver those savings in a way that is accountable and maximises return on investment.

ASSESSING ENERGY SAVINGS ACCURATELY

Knauf Energy Solutions (KES) now makes this possible. And the implications are transformational.

In the past, hundreds of factors could impact the effectiveness of a renovation including the quality of building materials used, the skill of the people installing those materials, ensuring everything and everyone performs as promised and how accurately savings were measured.

Barry Lynham, Managing Director, Knauf Energy Solutions, says: "We now have the means to accurately assess a renovation's potential and maximise its return on investment. We believe our processes and digital systems will revolutionise renovation in Europe."

ENSURING BUILDING STOCK IS NEAR-ZERO ENERGY USE

The European Union has embraced renovation as a key way to achieve Paris climate targets and the Energy Performance of Buildings Directive now mandates that Member States must make their building stock near-

"Since 2010 Knauf Insulation has been supporting research into building physics and refining solutions to tackle performance issues."

Barry Lynham, Managing Director, Knauf Energy Solutions

zero energy use by 2050. Renovation is a cornerstone of this directive and countries must create strategies to step up renovation rates. The magic number is the renovation of 3% of buildings every year up from around 1% at present.

"We believe that KES can make a significant positive impact on renovation rates across Europe by delivering quantifiable metered results at scale," says Barry. "Since 2010 Knauf Insulation has been supporting research into building physics and refining solutions to tackle performance issues. KES is the inevitable conclusion of these years of research."

FINDING SOLUTIONS FOR FUTURE GENERATIONS

Over the years it was vital to gain insight into the challenges of all building types. Design issues such as cavity wall sizes, loft gaps or other neglected areas of buildings can all have an impact on energy savings as well as problems such as condensation or mould.

"Buildings use 40% of energy and cause 36% of emissions in Europe. It is unacceptable. We need to find a solution for generations to come. With KES we can make a difference," says Barry.

 For more information visit [knaufenergy.com](https://www.knaufenergy.com)

HOUSING COMPANY FEEDBACK

Bart Vranken, Director of SHM Woonpunt Zennevallei:

"Working with Knauf Energy Solutions is helping us re-imagine the way we retrofit our stock. Their combination of advanced Internet of Things technology, innovation and on-site quality control is unique. It offers us a great opportunity to dramatically improve our stock's energy performance."

Koen Verdr, Director of Mijn Huis:

"We have partnered with Knauf Energy Solutions to deliver high performance retrofit designs that work in practice, not theory."

Luc de Smedt, Director of Brugse Maatschappij Voor Huisvesting:

"KES is using high performance data to enable us to find a practical approach to insulating the walls of our older stock that reduces future maintenance risks at an affordable cost."

BUILDING THE WORLD'S VIRTUAL ENERGY INFRASTRUCTURE

At Knauf Energy Solutions (KES) we believe that the smart 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.

For the first time energy efficiency can be measured in the same way as energy generation — meaning a kilowatt hour of energy saved is now equivalent to a kilowatt hour of energy supplied. Barry Lynham, Managing Director, Knauf Energy Solutions, says: "Instead of focusing on energy supply such as power plants or reactors we should be focused on infrastructure projects that save vast reserves of energy. KES turns the traditional energy infrastructure model upside down."

KNAUFENERGY
solutions

KNAUF INSULATION

WELCOME TO YOUR EXPERIENCE CENTER

Our Knauf Insulation Experience Centers provide specialist knowledge to maximise the performance of our solutions.

REAL PERFORMANCE = REAL BENEFITS

At Knauf Insulation, we manufacture solutions that provide energy-savings and contribute to fire safety and acoustic performance in buildings.

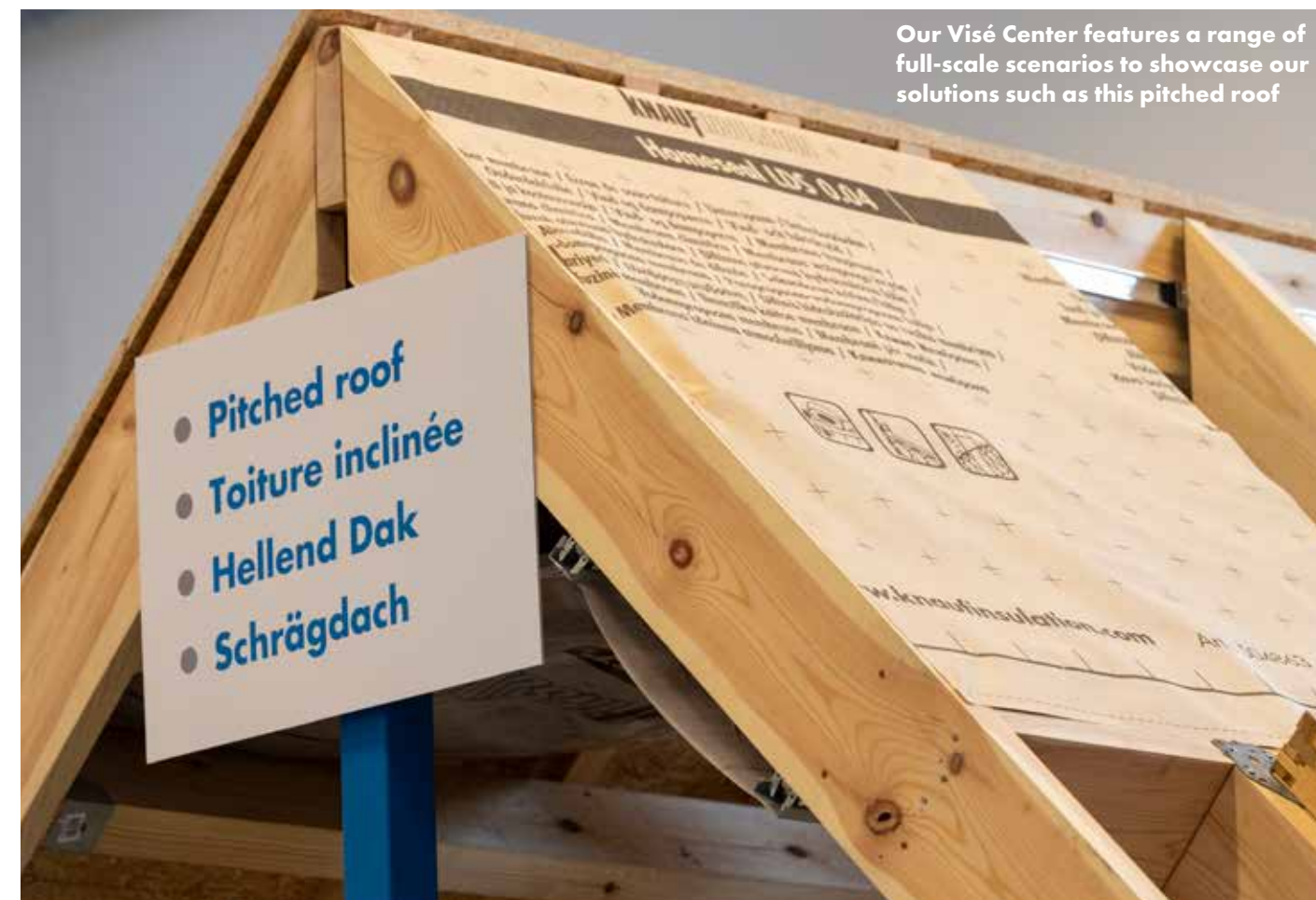
However, to ensure customers enjoy these benefits to the full, it is vital

that they are installed in a way that maximises their performance.

Our new Knauf Insulation Experience Center (KIEXC) at Visé in Belgium opened in 2019 and has been designed to provide this specialist insight while showcasing how our solutions can

contribute to sustainable building best practice.

Building on the success of our first KIEXC at Škofja Loka in Slovenia, here are five important ways our new 500m² Visé center is making a difference to performance.



Our Visé Center features a range of full-scale scenarios to showcase our solutions such as this pitched roof

1. REAL LIFE SCENARIOS

The center features a wide range of full-scale building scenarios including a pitched roof, ventilated façade, wall cavities, and reconstructions of a loft and internal partitions. Each scenario showcases our solutions and reveals how to install them for maximum performance.

2. LOOK THROUGH WALLS

For each building element of each scenario we have installed the Knauf Insulation solution that is most appropriate for maximum performance. Each scenario can also be customised to showcase unique building challenges and the specific solutions we offer. Using cut-away models, transparent panels, Virtual Reality and other technology, visitors can 'see through walls' to understand exactly how optimal performance is achieved in each application.

3. TRANSFERRING EXPERTISE

We provide state-of-the-art training for installers transferring valuable certified skills to enable them to carry out their work more effectively, offer customers more specialist insight and provide the full benefits of our solutions. Europe is facing a shortage of skilled labour and we need to change this.

SHOWCASE FOR OUR EXPERTISE

Our Experience Center in Škofja Loka in Slovenia showcases our most innovative solutions such as our Urbanscape Green Roof System. The center is always open to share building expertise and is an important education base for demonstration and training. During a KIEXC open day more than a thousand visitors came to the center.

"When I see a company continuously working on improvements it gives me greater confidence and I look forward to a positive future of cooperation."

Technical insulation installer Boštjan Jazbinšek from ISOFLEX, following a 2019 education seminar at KIEXC, Škofja Loka



4. WANT TO LEARN MORE?

At the heart of Knauf Insulation is a desire to future-proof the built environment. That is why our centers' doors are always open to anyone who wants to learn how to create low-carbon, energy efficient buildings that are comfortable and healthy. And that includes anyone who works with us. We always make sure that new colleagues experience the center for themselves to understand how Knauf Insulation is creating the solutions we need to meet the challenges facing our world and developing new ways to make a difference.

5. SUPAFIL MAX FRAME ADVANTAGE

Modular building companies can visit our center to experience how SUPAFIL® MAX Frame lightweight blowing wool can benefit their business. Up to 60 to 80m³ per day of SUPAFIL MAX Frame insulation can be injection-installed which means one or two bales can be processed every hour to achieve excellent thermal performance of 0.034W/mK. SUPAFIL MAX Frame is certified to Eurofins Gold Standard for Indoor Air Comfort, offers good acoustic performance and has an A1 incombustible reaction to fire.



Our Wood Wool board with Rock Mineral Wool insulation was chosen for the ÖAMTC Centre basement and parking area. Acoustic performance, appearance and fire safety were key considerations

TECHNICAL SUPPORT IS VITAL FOR ARCHITECTS

Johann Traupmann is one of the co-founders of Pichler & Traupmann Architekten (PXT), a practice in Austria. PXT projects include the futuristic ÖAMTC centre in Vienna, left, for the country's largest mobility club. The centre houses more than 800 employees and has won numerous architectural and construction awards.

"We are grateful for the technical support we have received from Knauf Insulation at many critical points in projects. For example, at present we have a performing arts centre project that offers serious acoustic challenges and Knauf Insulation has always been available to help us tackle these issues. Architecture depends on deeply informed technical insight, so I would urge Knauf Insulation to continue



to support architects and always be available.

"Sustainability informs every aspect of buildings today and we need to focus on recyclability, dismantling and flexible products we can reuse.

"Building space use is another critical aspect of sustainability. We need to know how we can maximise every centimetre of building space to meet the demands of population growth."

points in our company's growth Knauf Insulation has never let us down. That trust has deepened over the years because Knauf Insulation demonstrates a human approach that consistently ensures a close, productive level of cooperation."

Emmanuel Pauwels is the founder of Green Living Projects in Spain which focuses on green building from conception to completion. Our solutions have been chosen for the company's high-profile projects.

"Sustainability must really drive innovation. For example, for the Government of Catalonia campus we used LEEDv4 ahead of its launch. When it came to insulation only Knauf Insulation products with ECOSE Technology® were compliant.

"The food industry is a fantastic example of genuine innovation. People want to know what is in their food and soon we will want to know what we are putting in our

products and buildings. Knauf Insulation must keep innovating and continue to have a clear goal of where it wants to go."

Saulius Maisevičius is the CEO of SVM BALTIC, a Lithuanian company which creates wooden modular buildings across 11 countries. Our solutions are used in their timber frames.

"We use Knauf Insulation in our prefabricated modular houses. The company is one of our strongest partners providing great support across a range of different technical requirements in a variety of different countries.

"Your people and products are great and we have a good chemistry. The biggest challenge that we face is that each different country applies different regulations, for example, for acoustic performance, fire or weather conditions — so we appreciate the customised technical support we get from your company."

FEEDBACK FORUM



Dmitry Timoshenko is Purchasing Manager for Leroy Merlin in Russia which has 96 stores across the country. Knauf Insulation has developed new DIY solutions with the company.

"We started a new DIY range with Knauf Insulation in 2016. We worked together on everything from the name and packaging to the product and have changed the market. Our business is growing by high double digits year on

We invited six key customers to discuss how Knauf Insulation inspires customer-centric success.

year. Insulation needs to come a long way to educate customers. How much does it really cost in the long term? Companies need to sell education to customers to understand the long-term savings they will achieve."

Denis Brouwer is CEO of Jongeneel, a Dutch building materials distribution company that dates back to 1797. We have been a partner with Jongeneel for decades.



"People do business with people. You have good people and you have superior products. Your challenge is that you are product driven, if you look beyond, outside your products, you will do better.

"When you explain an economical model in a way people can understand, it makes a difference. The only way to sell is to listen to customers and that is what you are doing."

Božo Černila is the CEO of Trimo Group, a leading European sandwich panel producer. Knauf Insulation has been working with Trimo for more than 20 years.

"We are an innovative company that needs quality solutions, but what is equally important for us is that at critical



Customer-led innovation

Many companies promise to put customers first, but at Knauf Insulation we aim to go further using anthropological research techniques to unlock what is really needed on job sites. Agnieszka Strzemińska, Marketing Manager for Poland and the Baltics, explains.

A team of anthropologists has been helping our colleagues come to a deeper understanding of the challenges facing customers on construction sites and how we can help.

We wanted to develop beyond traditional conversations about issues such as prices, after-sales service or technical details and pursue a more authentic level of customer knowledge. For that we needed anthropological expertise.

LEARNING TO LISTEN

The result has been KI Discovery, an initiative that started with a pilot project in the Baltics and has now grown to include 114 of our colleagues across 68 construction sites providing hundreds of insights. The project is now gaining momentum right across our company.

Agnieszka Strzemińska, our Marketing Manager for Poland and the Baltics, says the project evolved from a need to achieve a real understanding of

construction site issues to genuinely address the challenges facing installers.

“To ensure this was a success it was important to find the time, expertise and right approach to understand the work of installers and carefully listen to them being experts in their job,” she explains.

“We were used to talking to installers on a daily basis but the circumstances were usually connected to sales — and making a presentation is not a conversation.”

To be authentically customer-centric it is vital to establish the dynamics of having a conversation, she says.

“It became clear that when we genuinely engaged and listened to installers, we became knowledgeable and understood their expertise rather than simply presenting ourselves, selling a solution.”

Using research methodology, supported by anthropological experts, colleagues were trained in new ways of observing, interviewing and learning. This meant asking more open questions and learning to understand “what customers need, not what they want”.

CUSTOMER REALITY

“We want to really understand our customers – not the ‘polished versions’ of themselves – but the authentic versions that are real and active on site,” says Agnieszka.

“We want to provide innovations based on real needs and increase the perceived value of our products and solutions. With KI Discovery this is what we are achieving.”

REWARDS AND MORE FROM

Our new Captain K Partner Program offers professional installers a wealth of customer insight, training opportunities, professional tips, instant-win opportunities and a range of rewards and benefits.

The aim of the Captain K app is to provide essential support to installers directly on-site, which helps their customers get more expertise and even more out of our energy-saving solutions. Further useful features such as calculation and measuring tools as well as precise installation weather forecasts and reference book are also set to be integrated step-by-step, to develop the program further and keep it attractive for our customers.

Installers can collect K-points in return for purchasing our products; attending Knauf Insulation events such as training workshops; taking part in surveys or visiting exhibitions and so on. K-points points can be exchanged for top-quality tools, electronic goods or household items and the installer with the most product scans every month receives an instant reward. Poland was the first country to benefit from Captain K.



“We want to really understand our customers – not the ‘polished versions’ of themselves – but the authentic versions that are real and active on site.”

360-degree insight:
our KI Discovery
Project Team

DIGITAL SOLUTIONS SUPPORT OUR FOCUS ON CUSTOMER-CENTRICITY

Knauf Insulation Systems Division updated our popular Exper-teK calculation tool and created new Building Information Modelling (BIM) objects for HVAC solutions and fire protection products. The 2.0 version of the Exper-teK tool allows customers to calculate heat loss and energy costs followed by recommendations

from our portfolio. Exper-teK is free and can be used for pipe, ducts, equipment and flat surface calculations. Our BIM objects for Thermo-teK (heating, ventilation and air-conditioning insulation) and Fire-teK (fire protection for air ducts) feature data to design and realise construction projects in a BIM environment.

RUSSIAN CUSTOMERS BENEFIT FROM RANGE OF NEW SERVICES

In Russia, we are piloting a Direct Delivery project for a few loyal installers in Moscow. Installers get insulation faster than from their nearest store at competitive prices.

Russian customers are also benefiting from a return-on-investment calculator which demonstrates energy savings using our insulation. The calculator can be found at knaufinsulation.ru.

In addition, customers can enjoy exploring a range of potential new-build homes on plans.ru, Russia's biggest DIY home-building website. To help customers with energy-saving, each house project plan is linked to our solutions.

PIONEERING NEW IDEAS

From new virtual worlds and smart homes to giant green roofs and brighter garages, our innovation teams are developing solutions that are shaping the future.



GREEN ROOF RECORD

In 2019 we celebrated the completion of our biggest Urbanscape Green Roof in France – an installation of 8,300m² on a commercial building in Champniers – which was installed by just seven people without the need for a crane. The Urbanscape system will store more than 4,800m³ of rainwater every year – the equivalent of almost two 2,500m³ Olympic swimming pools.

Picture: Pikt'Air

ORCHID IMPROVEMENT

Knauf Insulation Green Solutions is developing an innovative growing media known as HUge for the cultivation of orchids featuring our Rock Mineral Wool. Orchids comprise the largest family of flowering plants on Earth, with over 30,000 different species. However, cultivating them can take up to 36 weeks. Initial tests have shown that Knauf Insulation's substrate enables more effective, faster orchid growth compared to traditional growing media.



BRIGHT IDEA

Our new Lumax range in Germany is ideal for hallways, basements or underground car parks – offering highly effective insulation and outstanding lighting. The new range features embedded LED lamps which provide a bright, light ambience, while our Tektalan wood wool multilayers offer an attractive alternative to traditional ceiling boards. In addition, the boards also provide effective thermal and acoustic performance and are certified Euroclass A2 non-combustible.



ATTIC SOLUTION

In North America we launched EcoBatt Integrated Roof Deck Insulation to help meet the demands of changing building codes – specifically California's highly demanding Title 24 Code Requirements. This code defines minimum insulation R-values between roof rafters in contact with the roof deck and additional ceiling insulation between the attic and conditioned space.

COOL CONCEPTS

Summers can be incredibly hot in the south of Russia, Uzbekistan and Kazakhstan. That is why we are launching Knauf Heat Protection designed to keep buildings cool in these countries and save air-conditioning energy. In addition, we are launching AkustiSLIM 27mm in the region, which is designed to improve the acoustic comfort of homes, while ensuring maximum space saving.

PANEL SUCCESS

Knauf Insulation with manufacturer Trimo and the Slovenian National Building and Civil Engineering Institute has created two new panel concepts. The innovation was part of the TIGR4smart project to create new products that improve energy efficiency, increase sustainable material use and integrate information technologies in buildings. A demonstration modular residential unit was created in Slovenia.

VIRTUAL WORLDS INSPIRED BY REAL-LIFE SOLUTIONS

To showcase innovation and support with customer training when our commercial teams are at branch or trade events, we have developed virtual reality (VR) environments which are presented through Oculus Go headsets. One environment focuses on the acoustic performance of our insulation – adding different insulation materials into walls to show the impact of noise. The other (which is being finalised) brings our sustainability credentials to life from raw materials to the creation of high-performing, safe, comfortable and healthy buildings.





WHAT OUR CUSTOMERS SAY MAKES A DIFFERENCE

"We will definitely continue to use products with ECOSE Technology. The Mineral Wool and binder without the addition of formaldehyde is quick and easy to install and has a pleasant smell. Dust and fluff levels are also very low."

JP Isolatie, Netherlands

"I will recommend the pipe section with ECOSE Technology to my colleagues and definitely continue to use it in my company."

Dietmar Orlowsky, Bonn, Germany

"Knauf pipe with natural binder is super!"

Thomas Schrecker, Berlin, Germany

"The natural colour of Mineral Wool with ECOSE makes it easy to recognise. It is a smooth material that is comfortable to handle and cut and it recovers very well after the packaging is opened."

Andy Eccles, Powertherm, UK

DECADE OF SUCCESS

In 2019 we celebrated the 10th birthday of our ECOSE Technology®, a revolutionary binder with no added formaldehyde. When it was launched ECOSE was a step change for the Mineral Wool industry and its award-winning benefits continue to impress. Here are 10 reasons why.

1. COMPOSED OF UP TO 80% RECYCLED GLASS

Our Glass Mineral Wool with ECOSE Technology is composed of up to 80% recycled glass with the remaining content mainly derived from rapidly renewable materials.

2. NO ADDED FORMALDEHYDE

Our Mineral Wool with ECOSE Technology contains no added formaldehyde, artificial dyes or acrylics. The result is a naturally appealing appearance.

3. ENSURING GOOD INDOOR AIR QUALITY

Our Mineral Wool with ECOSE Technology was awarded Eurofins first Indoor Air Comfort Gold certificate for indoor air quality and is certified as a 'best-in-class material' according to Volatile Organic Compounds Indoor Air Quality emissions certification standards and criteria. Eurofins Indoor Air Quality criteria demonstrate compliance with many voluntary indoor air quality certification schemes such as Blue Angel in Germany and M1 in Finland. The Eurofins standard is also recognised by most of the Green Building Rating Schemes including BREEAM, LEED, WELL and DGNB.

4. LOW EMBODIED ENERGY

During a 50-year lifecycle, Mineral Wool with ECOSE Technology will typically save more than 500 times the energy that was used to manufacture it.

5. GREEN BUILDING RATING SCHEMES

Our Mineral Wool with ECOSE Technology can contribute to the total rating in Green Building Rating Schemes — such as BREEAM, LEED, HQE, WELL, LBC and DGNB — by adding points, for example, through the level of recycled glass being up to 80%, having no added formaldehyde, being REACH compliant as well as having externally verified Environmental Product Declarations for the majority of our products.

6. EXTENSIVE EPD COVERAGE

More than 80% of our Glass Mineral Wool with ECOSE Technology is covered with externally verified Environmental Product Declarations and for those that are not, we can deliver an EPD within 20 days.

When our Mineral Wool with ECOSE Technology was launched in 2009 it was voted Global Insulation Product of the Year. It continues to regularly receive award recognition.

7. USER FRIENDLY

From colleagues who manufacture our ECOSE solutions to those who install them, we have been told they have a more pleasant smell and are easier to cut than our traditional Mineral Wool products. In addition, our ECOSE solutions are compacted for easy storage, comfortable to handle and provide a rigid, flexible, tight and accurate fit.

8. PROVEN PERFORMANCE

Our Mineral Wool solutions with ECOSE Technology offer proven performance. They deliver top-level acoustics and noise control (Class A) and offer the highest fire safety rating — A1 non-combustible for most products. In addition, our ECOSE solutions provide highly effective thermal performance.

9. ROCK MINERAL WOOL WITH ECOSE

Our customers have welcomed the launch of our Rock Mineral Wool solutions with ECOSE Technology for heating, ventilation, air conditioning as well as for the thermal and acoustic comfort of buildings. In addition to performance, our solutions continue to provide the same levels of insulation and reaction to fire as the previous range. All our industrial and shipbuilding solutions are already available with ECOSE from our Novi Marof plant in Croatia, while at our new Rock Mineral Wool site in Illange, France, the latest technology has been installed.

10. A DECADE OF AWARDS

When Mineral Wool with ECOSE Technology was launched in 2009 it was voted Global Insulation Product of the Year. Since then it has picked up major awards on a regular basis. In 2019, awards included LeFonti Award for Excellence in Innovation and Communication and Trend of the Year in Italy.

DAWN OF A NEW ERA

“Asia is the fastest growing region for insulation and we see strong growth potential.”

David Ducarme, Group Chief Operating Officer,
Knauf Insulation

When our new €120 million Glass Mineral Wool insulation site opens in Malaysia in 2020, it will create 180 new jobs, have an annual capacity of 75,000 tonnes and provide energy-saving solutions for countries across the Asia Pacific region. David Ducarme, Group Chief Operating Officer, discusses how the new plant positions the company for the future.

Why is the plant so important to customers?

We are giving our customers access to highly effective quality solutions which they really appreciate – our insulation with ECOSE Technology®. The plant also brings us physically closer to our markets and, as we are installing the latest technology, we can respond faster in terms of product development or service to customers. This investment also demonstrates we have a long-term commitment to the region.

Why is the plant capacity significant?

It has been built bigger than current demand in the market which gives great growth opportunities. And, as the biggest, most efficient plant in the region, it also provides Knauf Insulation with a cost leadership position which in turn helps our customers to stay more competitive for the long run.

Which key countries will the plant serve?

Today we have four main markets: Japan, Korea, New Zealand and Australia and

we will be developing new partners and customers in those countries as well as looking at new markets such as growing economies like Vietnam or Indonesia as well as developed economies nearby such as Singapore, Malaysia and Thailand. Asia is the fastest growing region for insulation and we see strong growth potential.

What is the plant contributing to the success of Knauf Insulation's culture?

We think there is a good match between our culture and the strengths of the people we see in the region. There is a lot of entrepreneurship and enthusiasm there. People are extremely active and motivated to participate.

How is the plant building on the company's culture of continuous improvement?

We are starting not only with the best equipment and the best plant design, we are also starting with all our continuous

improvement backgrounds from day one. We are recruiting people with previous experience or people with the right attitude who we feel will work well in a framework where we will empower plant operators and local teams.

Safety is also a priority.

From day one we have put in place all the safety processes we have developed over the years. We are following the same standards as anywhere else and have had zero Lost Time Accidents (LTA) on the site. On September 27 we celebrated 500,000 hours without an LTA.

How are relationships with local suppliers?

We are developing local suppliers, not just for building and manufacturing, but also equipment. Suppliers from Malaysia, China and Vietnam, for example, are extremely capable and very competitive and they could be very useful to our global business in future.

What new products can be discussed?

In New Zealand and Australia we have a new forming technology that will introduce more rigidity to our solutions providing a better installation experience.

The plant will also use a high percentage of recycled glass.

There are countries in the region with a surplus of glass from bottle banks and sometimes more bottles than can be recycled. We will be able to consume a large part of that glass rather than sending it to landfill. For example, we are working with the Singapore government to see whether we could improve the collection of bottles locally and include that glass in our process.

What will be the economic impact of the plant in the Asia Pacific region?

We have created jobs for 180 people locally. Then around the region 20 more commercial jobs. In terms of the local

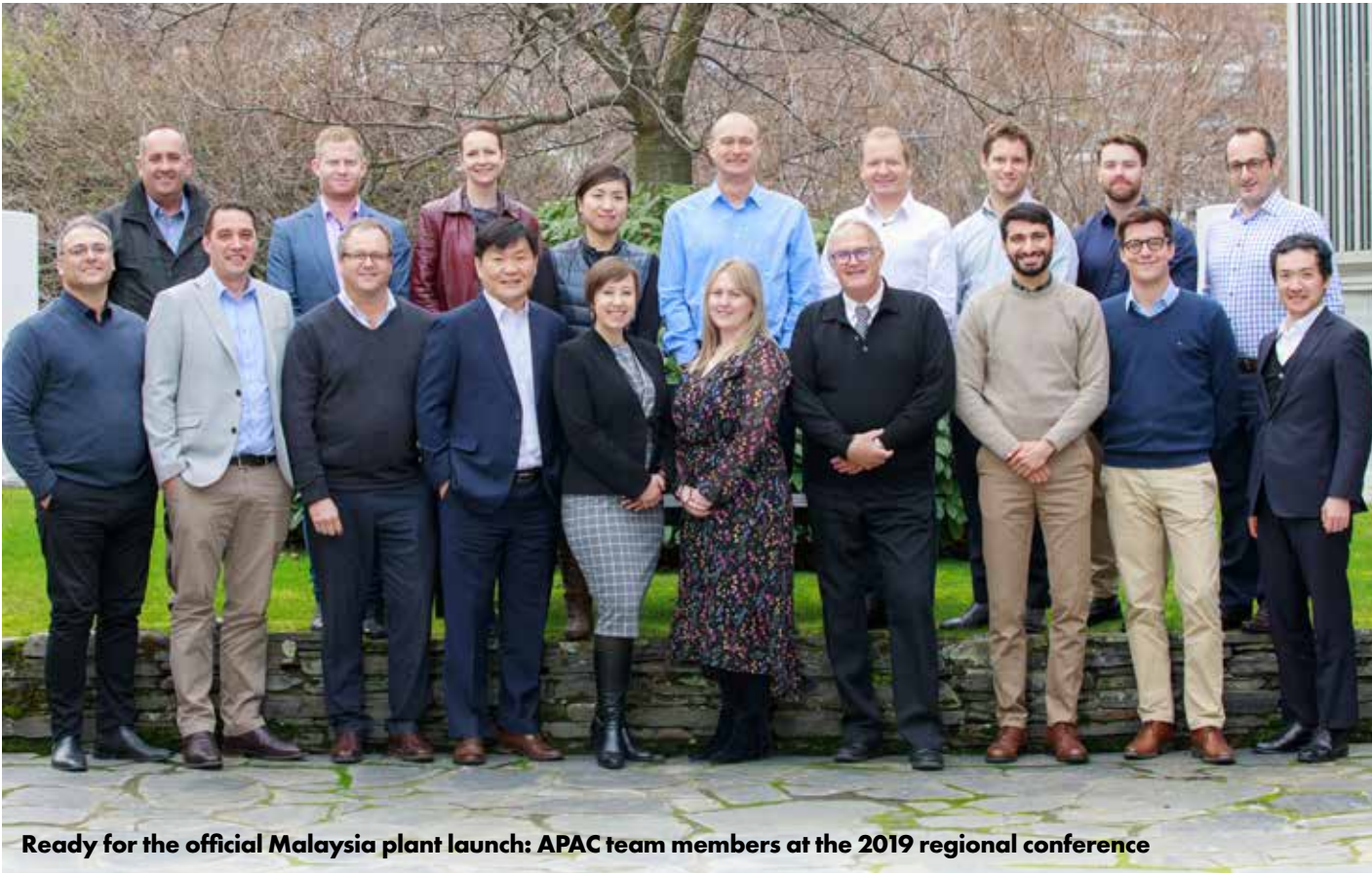
economy the benefits will be around US\$40 million a year – local services, jobs and materials – and then probably another US\$10 million in other countries for services such as transport and sea freight. Overall the full economic impact in terms of sales is about US\$100 million in turnover.

To what extent has Knauf Insulation's Asia Pacific team contributed to the plant's success?

Since 2010 they have achieved so much and that has enabled this massive investment. We are starting with a good level of capacity utilisation because they have been able to develop the right mix of customers. The local team and the customers are the ones we should congratulate for getting this investment approved. It's a fantastic partnership.

Any final thoughts?

It's the first investment but there will be more in Asia very soon.



Ready for the official Malaysia plant launch: APAC team members at the 2019 regional conference

MEET THE A-TEAM

APAC managers discuss how Johor Bahru will transform regional markets

Stuart Dunbar, Regional Managing Director (APAC): “Asia is the fastest growing insulation market in the world and it was important to invest in a regional plant to be in a strong position to fulfil future market requirements. The plant means we are able to help customers develop their markets and product offering through a diversified range and quickly adapt to develop new products as the market requires. In addition, the plant will be a springboard to continue the great progress we have made in developing new fire-safe solutions for our customers.”

Andreas Moutsatsos, Regional Finance Director (APAC): “The plant is only possible as a result of the hard work of everyone at Knauf Insulation and the support of our customers who believe in the company and our products. It is on the back of this loyalty that the investment has been made to further build on these relationships.”

Taku Onodera, General Manager, Japan: “Customers appreciate our attractive prices, long-term relationships based on trust as well as our prompt service. With the launch of Johor Bahru, lead times will be reduced from three months to one, enabling a faster, more flexible supply system for customers. Customers choose our products because of their eco-credentials and global reputation for quality.”

INTERNATIONAL INSIGHT

“The plant is a great example of the company’s approach to international mobility,” says Charles Pouzin, Supply Chain Manager. “In five years I’ve conducted supply chain missions in six countries. Now I’m in Malaysia. This wouldn’t happen in other companies. Professionally, it’s a challenge. Personally, it’s an adventure.”

Jeremy Brown, General Manager, New Zealand: “A ‘local’ plant shows customers we are prepared to invest in the region and are here to stay. By having ‘face-to-face’ technology and faster shipping times Knauf Insulation hopes to become the market leader in New Zealand. Other Glass Mineral Wool manufacturers in the region are using old technology. With the Knauf Insulation product range we can offer a more environmentally friendly and sustainable product that our end-users demand.”

JH Choi, Sales and Marketing Manager, South Korea: “The plant will reduce delivery times to South Korea, provide capacity for increased demands, offer products in different densities, enable customer-specific products and advanced solutions such as ECOSE Technology®. Our customers appreciate our superior technology, high quality and our binder with no added formaldehyde.”

WHY IS OUR MALAYSIA PLANT IMPORTANT TO CUSTOMERS?



‘The new plant will reduce shipping times for us and improve stock control. The products manufactured will be more specific to our region which will suit our market and allow us to really expand sales.’

Daniel and Rachel McMahon, Managing Directors of Building Supplies WA

‘We appreciate Knauf Insulation’s supply of innovative products, especially blown insulation which was installed in New Zealand’s first net-zero-energy Eco Village. The new plant will reduce lead times.’

Wade Maurice, General Manager of Safe-R Insulation and President of the Insulation Association of New Zealand



‘The new plant will provide an efficient supply chain due to its proximity to Western Australia. Knauf Insulation has innovative products, great service and friendly staff who are always willing to help. It is an environmentally-focused company that is constantly pushing boundaries.’

Robert Watson, Managing Director of Perth Plasterboard Centre

‘Knauf Insulation offers great technical and sales support to our business and provides excellent service getting products to our outlets around Australia. The plant will allow us to better control our stock holdings.’

Barry Marcom, Managing Director of Direct Plasterboard Outlet (DPO) and Direct Insulation Outlet (DIO)



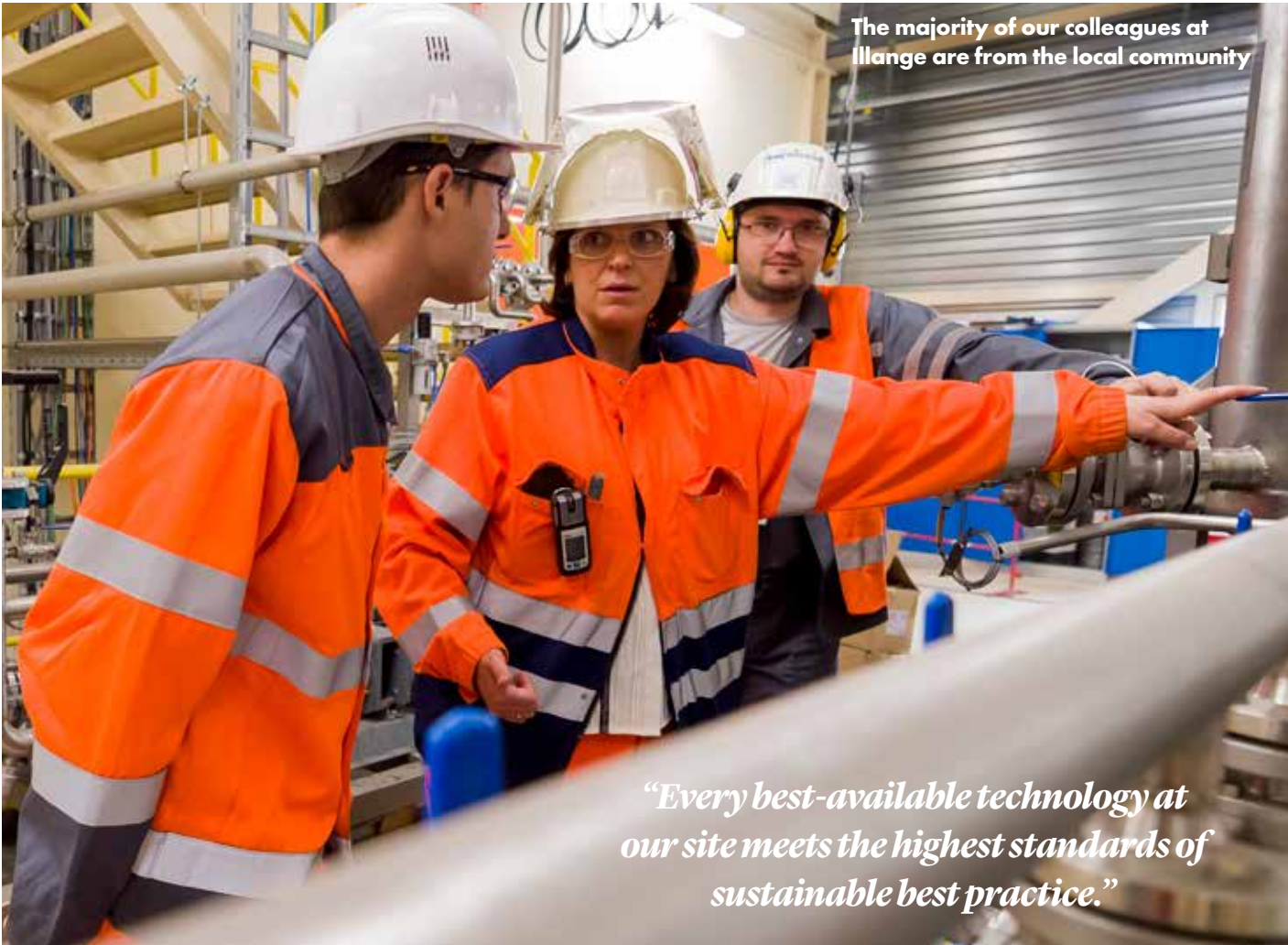
‘The support and product range we receive from Knauf Insulation is second to none. Our companies share a passion to realise the potential of untapped markets and the new plant will play a major role.’

Jeremy Watson, CEO and Owner of Alexander Watson Home Insulation

OPEN FOR BUSINESS

Our new €110 million plant in Illange is now up and running.

 Our new site in Illange, France, has created 123 new jobs and is expected to bring an annual financial benefit to the region of up to €20 million. Plant Manager Alain Rysman says: “The plant will produce 110,000 tonnes of our Rock Mineral Wool every year – enough insulation to renovate 25,000 homes. Demand in Western Europe is soaring for our non-combustible, energy-saving solutions with France in particular committing to the renovation of 500,000 homes every year.”



The majority of our colleagues at Illange are from the local community

“Every best-available technology at our site meets the highest standards of sustainable best practice.”



Colleagues from across the business worked to train and support the local team



NATURAL IMPROVEMENTS

We are working with local environment association AICINI to ensure that the 7.5 hectares of dedicated green space at our Illange site becomes a haven for plants, birds and insect life. Initiatives include extensive hedgerows, the planting of mature trees, and the conversion of half the site into wild meadows. In addition, central gardens will be planted and 3,500m² of our Urbanscape Green Roof Solution will be installed across buildings.

Mapping out the future: Arnaud Schweitzer of environmental association AICINI with Lydia Laville, plant assistant and Illange resident

ENVIRONMENTAL PRIORITY

Alain Rysman, Plant Manager, says: “Every arrangement has been made to protect the health of our colleagues, neighbours and the local environment. We are well below World Health Organization and European recommendations in every area of environmental impact and every best-available technology at our site meets the highest standards of sustainable best practice.”

100% RECYCLABLE WASTE

Rodrigue Durand, National Building Envelope Manager, says: “Our Rock Mineral Wool offers highly effective performance when it comes to acoustics, energy saving and fire safety. At the plant absolutely nothing is wasted — any residue is fed back into production — this material is 100% recyclable. We will be supplying Benelux, Italy and Germany but 50% of our material will go to France where there are ambitious national plans to reduce building energy use by 2030.”

LOCAL SUPPLIERS

Laure Robert, Logistics Manager, says: “There have been a lot of factory closures nearby so the creation of a new business is good news for the region. We also work closely with local companies, our pallet suppliers, for example,

are less than an hour away. We also use local waterways to transit most of our raw materials.”

MOTIVATED COLLEAGUES

Catherine Naveau, Human Resources Manager, says: “We held interviews based on candidates’ motivation rather than their CV. Our youngest colleague is 19, our oldest is 57. We wanted to offer a real chance to people who had faced social problems or long-term unemployment. We have 123 jobs, but we are having an impact on many more people — such as families and service providers. We also have a mix of backgrounds, ages and experience. Almost 50% of the workforce is made up of women.”

SAFETY FIRST

Thomas Mehl, Health, Safety and Environment Manager, says: “Safety is everyone’s responsibility. This message must be reinforced through continuous improvement and the modelling of safe behaviour — never being afraid to challenge anything or anyone who is unsafe. Meanwhile in terms of Green Building Rating Scheme certification, we are working with OsmoZ which focuses on environmental health and being certified by HQE which examines issues such as waste use, interior health and carbon footprint.”

ILLANGE IN NUMBERS

123 jobs created plus up to **400 indirect jobs**

Region will benefit from **€20 million** annually

A year’s capacity is enough to insulate **25,000 buildings**

€110 million site cost puts the plant in **top 10** of investments in France

BIRDS AND BEES

Collaborating with bee association APIFICA, we have installed hives to produce honey. We are also working with the League for the Protection of Birds and have created refuges for wild birds.



AIMING HIGH

A DECADE AGO

Our sustainability journey started in 2009 with the launch of our ECOSE Technology®, a revolutionary binder with no added formaldehyde. Two years later came a recognition that after a decade of significant growth we needed to think differently about the future of our business.

A NEW FOCUS

Drawing on expertise from across the company in 2011, we set long-term aims that focused on more sustainable operations — from zero carbon and enhanced management systems to employee welfare and products with a low environmental impact across their lifecycle. We also committed to lead the charge in energy efficiency.

TARGETING CHANGE

Promising ambition was easy, but we wanted to demonstrate concrete commitment. In 2012 we established mid-term targets for 2020 focusing on reducing energy use, CO₂ emissions, Lost Time Accidents (LTA), waste to landfill and water discharge.

Sustainability is a process of continuous improvement. Setting targets is just the start. At Knauf Insulation we are committed to constantly finding new ways to drive change. It is something we have been doing for nearly a decade.

YEARS OF SUCCESS

By 2016 we had achieved two critical successes — four years ahead of our deadline — and cut our CO₂ and energy use by 20% against our 2010 baseline. A year later, we achieved our target to reduce LTAs by 50%.

UNITED NATIONS' GOALS

In 2017 we aligned our strategy with the 17 Sustainable Development Goals (SDG) adopted by United Nations Member States. The goals set specific targets for 2030 and are described by the UN as a “blueprint for a better more sustainable future for all” focusing on issues of poverty, inequality, climate action and environmental responsibility.

CONTINUOUS IMPROVEMENT

Over the years we have learned how sustainability is a process of continuous improvement that requires everybody’s expertise and involvement. We have constantly found new ways to drive change and keep sustainability at the heart of everything we do. Setting targets was just the start — maintaining continuous momentum has been key to our success.

WHAT HAPPENS NEXT?

As we come to the end of our mid-term targets, sustainability issues continue to force companies to go beyond business as usual. At Knauf Insulation we are preparing to strengthen our commitment to sustainability by defining new milestone targets for 2025. Our journey continues.



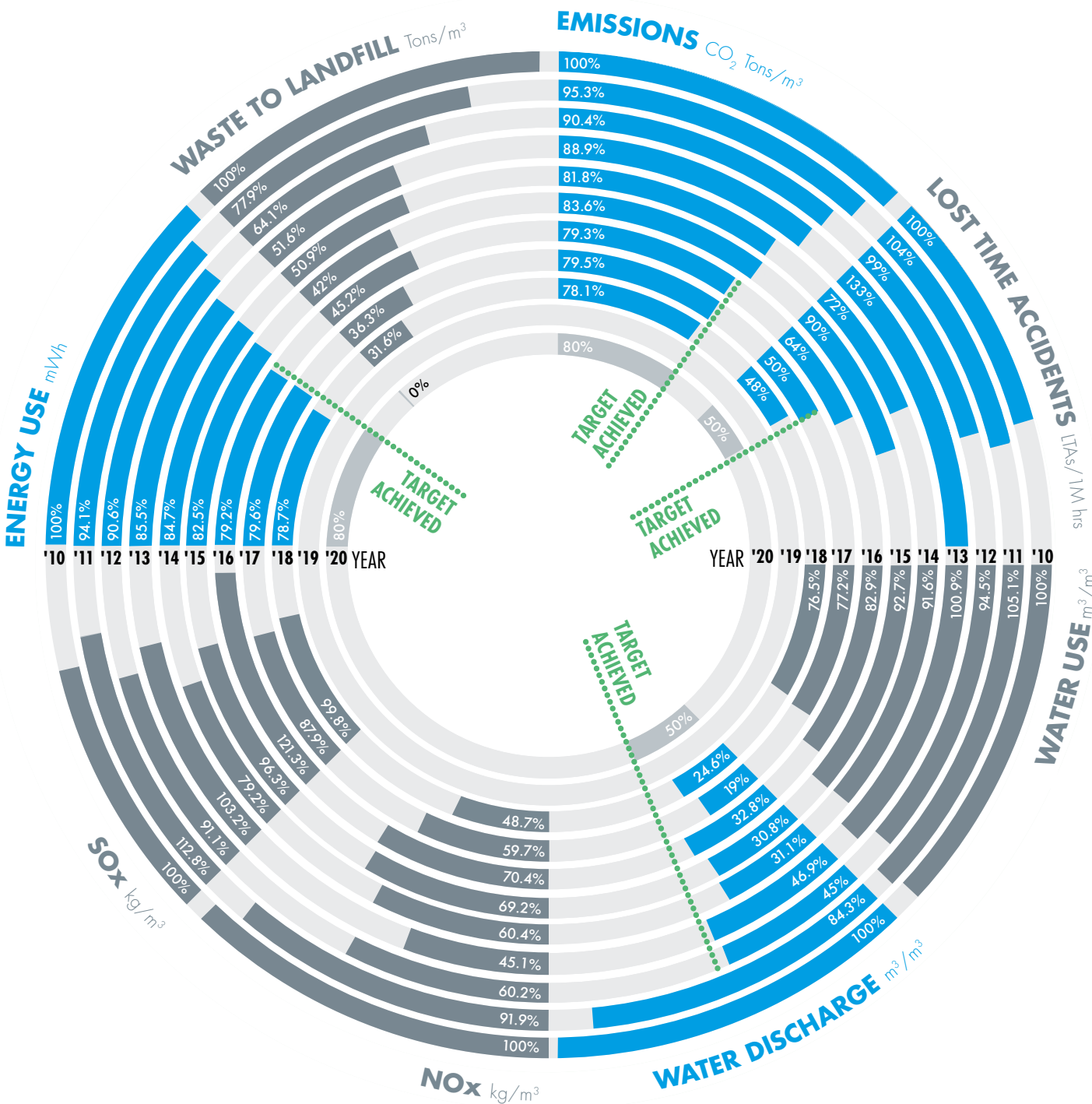
How Knauf Insulation is supporting UN Sustainable Development Goals

Knauf Insulation supports the 17 Sustainable Development Goals (SDGs) adopted by United Nations Member States. The goals focus on ending poverty, addressing social needs, tackling climate change and ensuring peace and opportunity for everyone.

The SDGs are an ambitious call to action to build economic growth that promotes prosperity for everyone while protecting the planet. The UN describes them as the “world’s best plan to build a better world for people and our planet by 2030”. We want to help.

3 GOOD HEALTH AND WELL-BEING	HEALTHY LIVES Our solutions support creating comfortable and healthy indoor environments and tackle noise pollution – all essential to well-being and comfort of residents.	11 SUSTAINABLE CITIES AND COMMUNITIES	URBAN RESILIENCE Energy efficient buildings are critical to sustainable and future-proof urban development – our solutions have an important role to play.	15 LIFE ON LAND	STOP DEFORESTATION We use wood mainly certified by the Programme for the Endorsement of Forest Certification to ensure our Wood Wool products are sustainable.
7 AFFORDABLE AND CLEAN ENERGY	TACKLING FUEL POVERTY Everyone should be able to afford to make their home comfortable. We campaign to reduce fuel poverty – a crisis that impacts 11% of Europeans.	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	MORE WITH LESS Our Glass Mineral Wool is created from up to 80% recycled material and our Rock Mineral Wool contains recycled steel slag.	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	ETHICAL CONDUCT As a company we do not tolerate discrimination, bribery or corruption. We are committed to fair competition, ethical and lawful conduct.
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	BETTER BUILDINGS Energy efficient buildings should be the priority of every government. We consistently campaign to put building energy efficiency at the heart of policy agendas.	13 CLIMATE ACTION	CUTTING EMISSIONS Our solutions reduce emissions from buildings and tackle climate change. We have cut our own emissions by over 20%.	17 PARTNERSHIPS FOR THE GOALS	PARTNERS FOR CHANGE We work with policy-makers and non-profit organisations to promote sustainable buildings, better building fire safety and improved energy efficiency.

OUR JOURNEY OF IMPROVEMENT



This report relates to Knauf Insulation, part of the Knauf Group, and uses data from 2018 and activities from 2018 and 2019. For accuracy we may amend previous figures.

Despite a record year of production in 2018 with all our plants running 24/7 we continued to reduce our environmental impact and Lost Time Accident rate. The reason for this success? A commitment to continuous improvement by everyone, every day at every site.

ENERGY AND RELATED EMISSIONS

Energy reduced by 21.3% and related emissions by 21.9% compared to 2010

In 2010 the company committed to reduce energy use and CO₂ emissions by 20% by 2020 and we achieved these targets four years before deadline in 2016. In 2018 we improved energy efficiency by a further 0.9% and CO₂ reductions by 1.4% compared to the previous year.

Philippe Coune, Group Environmental and Western Europe Regional HSE Manager, said: “Throughout 2018 all our plants were operating at maximum capacity — 24 hours a day, seven days a week — and the company enjoyed a record year.

“Despite this we continued to reduce our energy levels and emissions, particularly at our Glass Mineral Wool sites. This is a significant achievement and a credit to everyone at the plants.

“It is also a tribute to the success of continuous improvement which has ensured we maintained sustainable momentum despite our plants running overtime.”

SAFETY

Lost Time Accidents reduced by 52% compared to 2010

We achieved our 2020 commitment to reduce Lost Time Accidents (LTA) by 50% three years ahead of schedule in 2017.

In 2018, we continued to build on this success and LTAs were down by a further 2% to 48% — compared to our 2010 figures — as a result of zero complacency on safety rules and a full understanding of each of the incidents that lead (or not) to an injury of our employees or contractors.

The next area of safety improvement, already underway across the company, is to tackle the cultural challenge of behaviour.

WASTE

Waste to landfill reduced by 68.4% compared to 2010

Since our baseline year of 2010 we have avoided sending 243,000 tonnes of waste to landfill as a result of recycling initiatives externally and internally.

Our waste reduction for 2018 was down by

68.4% compared to our baseline year of 2010 and marks a 4.7% improvement on 2017.

Unfortunately, waste continues to be huge challenge for the company and for the construction sector generally. At most of our Rock Mineral Wool plants, briquetting — the processing of residue into bricks for recycling — is done off or on-site with an environmental pay-off of SOx increases (see below).

Meanwhile, although many external companies have been using residue from our Glass Mineral Wool plants as raw material we want to get more involved in recycling initiatives. We would also like to see more support from the authorities as well as regulation to give company recycling initiatives more momentum.

SOx and NOx

SOx down by 0.2% and NOx reduced by 51.3% since 2010

Our NOx has been reduced by 51.3% since our 2010 baseline and our 2018 figure was down by 11% compared to 2017.

The decrease is as the result of maximised output backed by efficiency improvements and new equipment particularly with regard to our melting technology, better plant maintenance planning and improved settings.

SOx, however, is up by 11.9% in 2018 compared to the previous year as a result of our record production levels and inevitable use of more recycled content.

Unfortunately, processing more recycled briquettes and glass cullet inevitably results in increasing levels of SOx emissions. It is a delicate balance that requires careful management.

WATER USE

Water use is down by 23.5% and water discharge down by 75.4% since 2010

Across Knauf Insulation, we have cut our year-on-year water use by 0.7%. As a result of reusing more water in our closed-loop processes particularly in Glass Mineral Wool plants we have cut back our use to 76.5% compared to 2010 levels.

In 2018 water discharge was up 5.6% compared to the previous year but overall had been reduced dramatically by 75.4% since 2010. We achieved our 50% reduction in water discharge target in 2012 — eight years ahead of our 2020 deadline.

CHANGE FOR THE BETTER

We are constantly exploring new ways to minimise our environmental impact.



DECARBONISING CAR PARKS

Our team in Slovenia has started decarbonising its car park. E-charging stations have been installed and parking spaces have been reserved for e-vehicles in front of the Knauf Insulation Experience Center. An e-car has also been bought by the company to allow colleagues first-hand experience of the benefits of electric vehicles.



CWMBRAN REDUCES EMISSIONS BY MORE THAN 5,000 TONNES

A £7 million upgrade of our UK manufacturing plant in Cwmbran has reduced the plant's annual emissions by just over 5,000 tonnes per year. The upgrade included a complete rebuild of the furnace, plant-wide refurbishments and the introduction of the latest technology as well as energy efficiency improvements such as installation of new turbo compressors, drives and motors.

In addition, about 2,000 light fittings were replaced with energy-efficient LEDs, all plant staff attended energy awareness workshops and energy efficiency has become an integral part of the induction for new employees. "Continuous improvement has driven culture change and helped us save energy by standardising our processes and minimising wastes," says Femi Olatunji, Plant Energy Manager.

CERTIFIED TO FOUR KEY STANDARDS OF MANAGEMENT

Knauf Insulation is the only company in its sector to have all plants worldwide certified to ISO 9001 standard for quality management; ISO 14001 for environmental management; ISO 50001 for energy management and to OHSAS 18001 for health and safety management. The standards are all voluntary but internationally recognised as independently verifying a company's performance claims.



RENEWABLE ENERGY AT BELGIAN PLANT

Our Visé plant is now one of the top five companies using renewable energy in the Wallonia region of Belgium. The installation of 6,000 photovoltaic panels at the plant in 2019 will provide 1,700 MWh of energy every year — around 2% of the annual energy required by the plant. We also aim to reduce lighting energy by up to 80% through a light modification process.



SCHEME TO TAKE-BACK PALLETS

In Western Europe Knauf Insulation has launched a pilot take-back scheme to reuse delivery pallets from our Glass Mineral Wool plants. Pallets used to deliver products are now recovered from customers by a partner company and brought back for reuse. Plans are in the pipeline to extend the initiative to other sites and countries where the scheme will be known as KI(RE)3 — for reduce, recycle and reuse. In France alone, more than 1.5 million square metres of timber are used to manufacture 48 million pallets every year.

RECYCLING SERVICE FOR CUSTOMERS

Knauf Insulation is offering a new smart waste recycling service to customers in the Netherlands who use our Glass Mineral Wool for modular buildings. For a monthly membership fee of less than €500 we will take care of all related production waste. A smart software system monitors the output of our waste recycling machinery at customers' sites and automatically notifies our pick-up partner company when the waste is ready for collection. After being returned to our recycling partner, the waste is then fed into their production process to make new insulation. We aim to collect 325 tonnes of waste a year giving customers peace of mind and helping improve everyone's environmental impact.

The power of improvement

Continuous Improvement (CI) is one of our three strategic pillars at Knauf Insulation along with safety and customer-centricity. Over the past 10 years, Continuous Improvement has had a significant positive impact at our plants. In 2018 we started rolling out the approach in non-manufacturing areas and there are now more than 50 improvement projects being implemented across Knauf Insulation. CI in non-manufacturing is led by Val Popovici, Group Project Management Office Lead.



“Our goal is to build a high-performing culture in which every single employee is an active contributor to the company’s success.”

What is Continuous Improvement? And why is it important?
CI is a proven approach to improving business performance. Its core principle is the alignment, engagement and empowerment of all employees. This means that we want to teach our people to solve problems and bottlenecks in their processes without the intervention of expensive consultants or experts. The changes and improvement they make are more sustainable because they made them themselves. CI helps our people make their work better and easier. We believe predictable processes – without fire-fighting – means work is more rewarding and results more predictable.

How are pain-points being resolved?
CI is a partnership. Our people have a wealth of knowledge about our company’s processes and we want to tap into their ideas and expertise. Meanwhile, at the Project Management Office we support colleagues by bringing an external perspective – providing the tools, people, knowledge or best practices to help resolve issues and coach them along the way. We aim to achieve a self-organising culture that says, ‘We have identified a problem, what can we do to solve it?’ One way of achieving this culture is by introducing the so-called

‘daily management’ process whereby teams examine their performance measures, identify pain-points in the process and explore quick solutions and come to an action plan to solve them.

How widespread is CI at our non-manufacturing sites?
All Knauf Insulation regions and our HQ have embarked on the CI journey. Today we have dozens of improvement projects that are completed or ongoing. We started rolling out CI in areas where there were the biggest opportunities for improvement. These are usually



Continuous Improvement meetings for non-manufacturing have been held throughout Knauf Insulation

at a pivot point or grey zone between different departments or processes. For example, we launched CI last year in various local customer services – an intersection between customers, sales, manufacturing, logistics and finance. By implementing improvements there we uncovered further opportunities upstream and downstream which helped us pursue additional improvements and bring other departments to the table.

To what extent have the pilots been a success?
If we look at individual process performance indicators and above all our employees’ satisfaction, we are seeing a positive trend in every improvement project and this is a testimony to the hard work of everyone involved. People have put in a lot of time and effort on top of their working day, but now they are reaping the benefits. People are feeling more empowered and in control of their

work rather than feeling under pressure and constantly fire-fighting.

Can you give examples?
We have dramatically reduced the time it takes to create SKUs (stock keeping units) and we are implementing technology to get even better results. Another example has been the performance improvements around order intake and processing at customer service points across Knauf Insulation – from UK to France to Germany to Russia. Knauf Insulation employees are really seeing the benefits and are looking for the next improvements. That is a great sign that we are doing something right.

How has CI impacted our customers?
Levels of satisfaction have improved and so has customer feedback. CI helps customers do business with us more easily and efficiently. We are becoming more customer-centric, with external

and internal customers. We teach our colleagues to think about “what is critical to our customers” and “how will they measure what we do”.

How will our CI success be scaled up?
CI has been incredibly successful in our plants and we want to replicate this success in non-manufacturing areas. We have more than 2,000 people involved in these areas at Knauf Insulation EMEA and APAC and we have trained and coached more than 200 people to date on CI. Our goal is to build a high-performing culture in which every single employee is an active contributor to the company’s success. This means a culture where everyone, in every part of our organisation works on improving our company every day. This is a culture based on behaviour driven by a shared understanding and alignment to our company’s values and goals. CI is a never-ending journey and we excited to have embarked on it!



"At Knauf Insulation you can blossom among great colleagues from all over the world on international projects. VIE graduates get great opportunities in the company and the company benefits from a fresh vision."
Suzie Hazotte, Marketing Specialist



"Where will I be in five years? There are many interesting positions, either in the plants or the central division. It will depend on what is available and the results I deliver, but I want to progress as far as possible."
Harrison Gustot, IGTP Process Engineer



"Continuous improvement? Over the years we work with people at every level to learn the best and worse practices for improvement. We are constantly working on best examples and best practices."
Giuliana Rivituso, IGTP Process Engineer



"We are working on projects to target better quality, better productivity and better energy savings and in the end, the customer benefits from this. More action is being taken to think like a customer to implement positive change."
Adrien Saracco, IGTP Process Engineer

PEOPLE POWER

Young graduates are transforming their global careers with Knauf Insulation helping our company build on the culture that has made us such a success with customers.

Knauf Insulation is investing in a new generation of young talent to enliven the culture that gives our company a successful competitive edge.

Master's Degree graduates from the European VIE scheme are maximising their career opportunities at our sites around the world, while our International Graduate Training Program (IGTP) has gone from strength to strength with more than 1,300 applications for eight positions in the two years since it started in 2018.

This program offers graduates a chance to travel to Knauf Insulation sites around the world, explore a range of career opportunities, experience training in the manufacturing of

Glass and Rock Mineral Wool, work with people at all levels, develop new skills and experience ownership of critical projects.

Understanding the big picture of our company will help IGTP graduates become future leaders. Ideally, one day, they should be able to manage a plant.

Meanwhile, the European VIE scheme set up by the French Government, allows Master's Degree graduates from European Economic Area countries 12- and 24-month opportunities in different departments and the chance to accelerate their career through mentorship and deep learning from a diverse range of cultures.



"What is important for me is to explore a bigger world and learn new skills. I want to understand what I'm good at. Where can I make a real difference?"
Alejandro Simó Versperinas, IGTP Process Engineer



"We get insight into all aspects of the company and the bigger picture following training sessions for Research and Development, Marketing, Purchasing, Logistics and Finance. Working in process for both Glass Mineral Wool and Rock Mineral Wool provides a global perspective."
Anastasia Parlali, IGTP Process Engineer



"Career highlights? The people and opportunities. I have visited many Knauf Insulation sites and I'm always impressed by the high level of competence, experience and willingness of colleagues to help. The International Graduate program is a unique opportunity to speed up my career."
Camilla Saltini, IGTP Process Engineer



"VIE is a contract, it gave Knauf Insulation and myself the opportunity to work together. What helped me develop professionally was the environment I was working in: my manager acted as a mentor; colleagues around me welcomed me warmly and helped me learn and I enjoyed the experience and fantastic diversity of a different region."
Charles Pouzin, Supply Chain Manager

8 WAYS TO INSPIRE A NEW GENERATION OF WOMEN ENGINEERS

Female engineers at Knauf Insulation give advice on how to encourage more women to take up engineering as a career.

1. DEMYSTIFY THE JOB

"I think there is a preconception that the construction industry is a mucky, hands-on and labour-intensive industry and there needs to be a drive to show girls this is not the case," says Rebecca Wilde, a Process Engineer at Process Support and Development.

2. INSPIRE DIVERSITY

New graduate engineer Anastasia Parlali says: "Construction companies could initiate more visits for students – especially women – to become familiar with engineering." Ayşe Okumuş, a Maintenance Planner at our Eskişehir plant in Turkey, agrees. "Turkish companies in construction don't employ women. There is one – their motto is 'a she for a he' – this is a major step forward and I'm hoping it will become widespread. Women can do anything men can do."

3. KEEP LEARNING

"My advice for female engineers? Keep motivation high and learning constant," says Giuliana Rivituso, an International Process Engineer at our Illange plant in France. "Embrace new learning opportunities," says Karina Berlig, Production Manager at our Bernburg site in Germany. She started her career as a food production nutritionist before taking over laboratory management at Bernburg. Three years ago, she took charge of the plant's production.

4. BE YOURSELF

Camilla Saltini, an International Process Engineer at our Novi Marof site, Croatia, says: "Be yourself, you are an engineer just like your male colleagues. Be confident in your abilities and proud to be a woman in this field."

5. LEARN TO STAND OUT

"Being in a male-dominated industry means it is easier to stand out as long as you remain confident and true to who you are," says Eleanor Brown, an Assistant Product Manager at our St Helens Plant in the UK. Jana Lovásová, HSE and Systems Manager at our Krupka plant in the Czech Republic, says: "Some work situations aren't easy, but it's vital to keep a cool head, keep positive and never give up."

6. SEEING IS BELIEVING

"We all need to tell women that it is possible to reach positions that were previously occupied by men," says Camilla. "We need to show examples of women working in this field and share experiences. Explain that their help is fundamental to achieving new goals and gender diversity."

7. BREAK DOWN STEREOTYPES

"Encouraging women into the industry needs to begin at school as there are so many gender stereotypes about jobs starting at an early age," says Eleanor. "I'm sure seeing or talking to a female engineer when I found my love for physics would have made me consider it as an option earlier."

8. FIND A MENTOR

"To succeed it helps to find a mentor you can talk to and who can push you," says Rebecca. "I got to know plenty of strong female engineers who guided me in the right direction." The final word goes to Margaux Dorthu, Process Engineer at our Visé plant in Belgium. "What advice would I offer women considering a career in engineering? Just go for it!"



To read the full interviews visit [knaufinsulation.com](https://www.knaufinsulation.com)

"What advice would I offer women considering a career in engineering? Just go for it!"

Margaux Dorthu, Process Engineer

PERSONAL AND PROFESSIONAL INSIGHT

- ✓ Our Knauf Insulation New Educational Offer (KINEO) is designed to develop new skills for the future and a key aspect of this involves better understanding ourselves and how we are perceived at work.
- ✓ We have launched a 360-degree review offering colleagues the chance to answer questions related to our values, principles and brand identity and get feedback from peers, managers and direct reports. The survey aims to explore leadership behaviour, strengths and development potential and align a development plan with the manager.
- ✓ In Russia and CIS we are adopting a customised approach to training to equip our colleagues with the individualised skills they need for specific roles and support motivated development more effectively.
- ✓ We are also working on ways to bring the Knauf Values of Commitment, Partnership, Entrepreneurship and Menschlichkeit to life in Russia and CIS using workshops, online tools to 'deep dive' into values and recognition cards to show appreciation for role models.



AUSTRALIAN SUPPORT

In Brisbane Knauf Insulation sponsored the Southside Eagles U15s girls football team. In Sydney, Knauf Insulation and Knauf provided a complete solution wall structure for a kiosk at the German International School. And, in Melbourne, Knauf Insulation worked with Soulspace Studios and Norsu Interiors to create comfortable new living areas for foster parents caring for five children.



40 YEARS OF KINA

We celebrated 40 years of Knauf Insulation North America (KINA) in 2018. The company began operations at Shelbyville, Indiana, and now has about 1,600 employees in six locations across the United States and is the largest employer in Shelby County. To celebrate the anniversary, everyone enjoyed a Midwest-style Oktoberfest, dubbed Knauftoberfest.



RECORD SWISS ROOF

Knauf Insulation Switzerland and system provider Sika Schweiz AG are installing the largest flat roof project in their history – 23,500m² DDP-X – on a new CHF86 million plant in the municipality of St Margrethen for rail vehicle manufacturer Stadler AG.



US\$35 MILLION INVESTMENT

A US\$35 million investment in our Albion site to meet growing demand for our blowing wool insulation products in North America will see the conversion and restart of a disused production line, create 34 new jobs and grow plant capacity by more than 30%. Our blowing wool capacity has been sold out for three years and the new line will improve supply to our US customers when it restarts in 2020. The extra plant capacity and new technology will also better position the company to expand into Canada and enable the development of new insulation products.



STADIUM SHOWCASE

A total of 6,000m² of our Ultracoustic 7 solution was chosen for the new 6,000-spectator Johan Cruyff Stadium in Barcelona, Spain, which opened in 2019. The new stadium is home to Barcelona FC's women's team and the Barca B team, just 30 minutes from the iconic Camp Nou. Ultracoustic was selected for its highly effective acoustic performance.

Bright ideas win bronze at Solar Decathlon

A Romanian team of professionals, students and professors known as Over4 has won bronze in the international Solar Decathlon Europe 2019 – a competition to build energy efficient homes powered by renewable energy sources. Over4 was supported by Knauf Insulation and faced competition from nine other teams from 27 universities in eight countries. The Over4 prototype featured a solar eco-passive house that can be built as a self-standing house and as part of a passive rooftop.



TRIPLE SUCCESS IN GLOBAL AWARDS

Knauf Insulation received three honours in the Global Insulation Awards 2019. The company was voted Global Insulation Plant of the Year for its new greenfield site at Illange; awarded Global Insulation Innovation of the Year for JetSpray and Davide Maiello, our Head of Market and Business Intelligence for Europe and CIS, pictured left, was named Personality of the Year. The awards build on last year's success when Knauf Insulation was voted Global Insulation Company of the Year 2018.



WOOD WOOL BOOST

A new production line has been introduced at our Wood Wool site in Simbach to enable the bonding of wood layers to insulation cores. The new system was completed in June 2019 and will increase the capacity to react to the increasing market demand and to provide a faster turn-around for customers.



UK monkey business

Knauf Insulation Northern Europe has donated a pallet of Earthwool Loft Roll to Monkey World in the UK. The rescue centre for 54 chimpanzees and 200 other primates was being renovated and required insulation. "The animals are from Africa and need warm rooms during cold days," said Charlie Crowther, Monkey World spokesman. "We work hard to avoid heat lost and as a rescue center that receives no outside funding, we needed to find ways to lower costs."



Landmark donation

Knauf Insulation has donated a landmark 20 million Czech crowns (CZK) to local clubs and sports organisations in the Czech town of Krupka in the decade since 2008. The landmark sum was reached following a January 2019 donation of CZK725,000 to local sports organisations. Krupka also operates a KI Grant for non-profits which distributes CZK500,000 annually.



DOUBLE CELEBRATION AT SLOVENIAN PLANT

2018 was a landmark year for our Škofja Loka site in Slovenia which saw the plant celebrate its 60th anniversary and the official opening of our new Knauf Insulation Experience Center. Rock Mineral Wool production started in the village of Bodovlje and today the Škofja Loka site enjoys an international reputation for the research and development of innovative high performance thermal, fire, acoustic and green solutions.

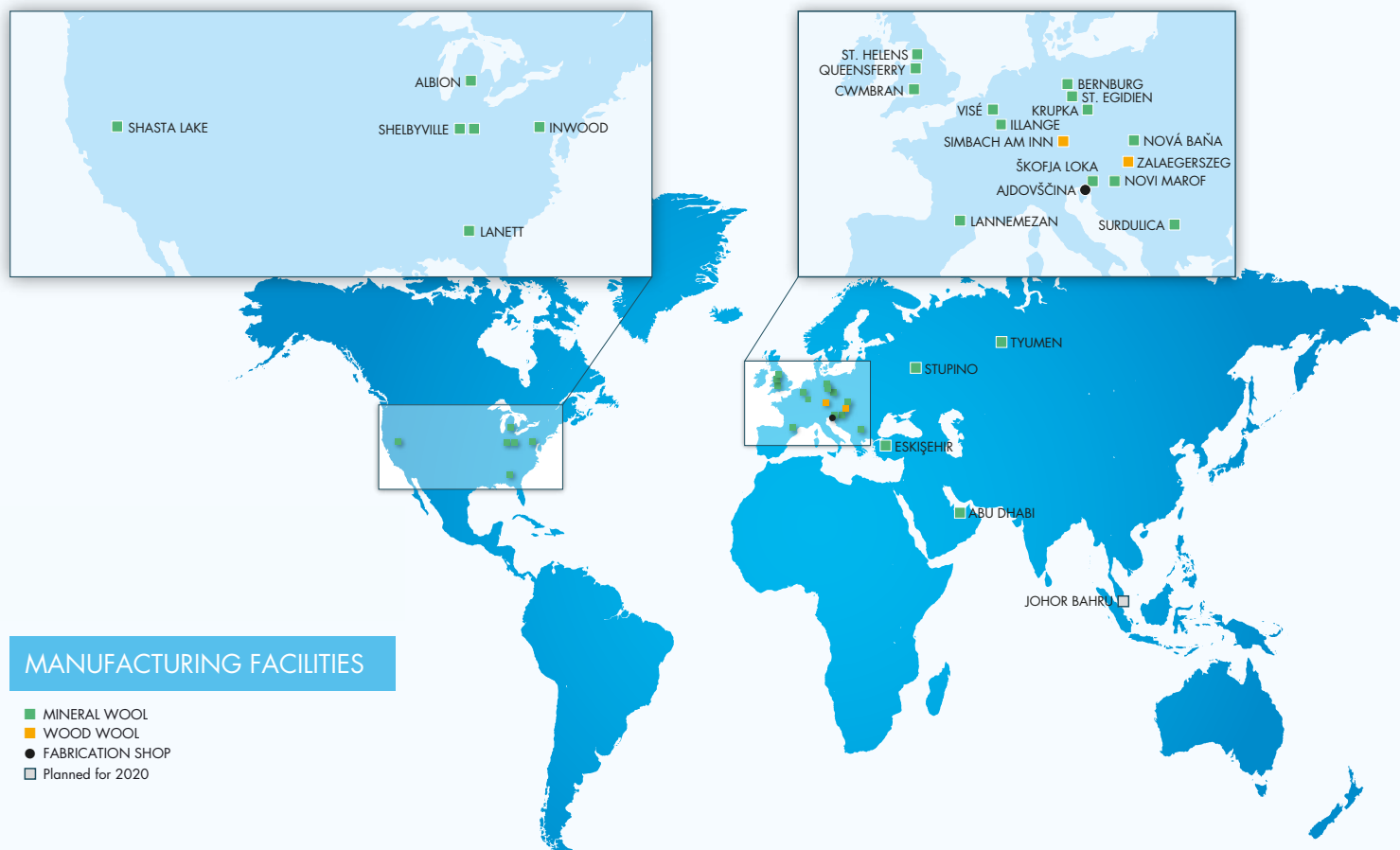


Charity champions

During the six weeks it took to carry out refurbishment work at our Cwmbran plant in the UK, the site's 207 employees volunteered their time with local charities under Knauf Insulation's 'Community Matters' programme. In total, 576 hours were given to supporting four local causes, including two hospices, a resource centre for people with learning disabilities, and an animal rescue facility.

challenge.
create.
care.

KNAUF INSULATION



ABOUT KNAUF INSULATION

Knauf Insulation has more than 40 years of experience in the insulation industry. Today the company employs over 5,500 people across more than 40 countries and has 27 manufacturing sites in 15 countries.

Knauf Insulation is part of the Knauf Group which has around 35,000 employees worldwide with more than 250 factories in over 80 countries and sales of 10 billion Euro (in 2019). The Knauf Group was founded in 1932 and remains an independent family-owned company driven by the values of Partnership, Commitment, Entrepreneurship and Menschlichkeit (humanity).

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.

FOLLOW US ON

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