



INSULATION MATTERS 2017

KNAUFINSULATION

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INTRODUCTION

CHALLENGE. CREATE. CARE.

I'm delighted to introduce my first edition of Knauf Insulation's annual publication *Insulation Matters*.

When I became CEO of the company in early 2017, I spent the first few weeks visiting every key plant in our worldwide network, talking to customers and meeting our colleagues.

What I discovered was a company that is not afraid to take on challenges – at every level.

Through research and development, we are creating new solutions that are reshaping the industry such as our Urbanscape® Green Roof Solution, SUPAFIL MAX Frame Blowing Wool for modular buildings, digital Building Information Modelling innovations and the service expertise that allows specifiers to unlock the points potential of Green Building Rating Systems.

We are also rising to the global challenge of climate change by ensuring energy efficiency in buildings is at the heart of every public debate while carrying out real performance renovation research that will ultimately shape political agendas.

And, as the world continues to face tragedy as the result of building fires, we remain resolute in our call to design fire risk out of buildings from the start.

Throughout our company, we have also challenged ourselves to do our jobs better. Through investment

in more efficient technology, a commitment from our colleagues at every level and a never-ending process of continuous improvement we have created an environment that cares.

This is not an abstract term. Caring is measurable. We care for our colleagues and the environment. Lost Time Accidents are down by a third from 2015 to 2016 and we have reduced CO₂ emissions by over 25% and cut energy use by 20% since 2010 – achieving our 2020 targets four years ahead of schedule.

We also care for our customers introducing new standards of excellence for logistics and product quality while providing the industry expertise that helps customers navigate a constantly shifting landscape with confidence.

However, some things never change. We remain proud of a history of excellence that extends back – in the case of Heraklith Wood Wool – 110 years. And we remain proud to be dynamic family-owned company that continues to invest in opportunities that strengthen our position as a leading player in the global insulation market.

JEAN-CLAUDE CARLIN
CEO, KNAUF INSULATION GROUP

ABOUT KNAUF INSULATION

Knauf Insulation has more than 40 years of experience in the insulation industry. Today the company employs over 5,000 people across 35 countries and has 37 manufacturing sites in 15 countries.

Knauf Insulation is part of the Knauf Group which has more than 26,000 employees worldwide with 220 factories in over 80 countries. 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).

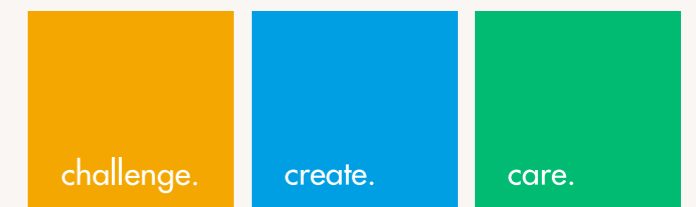
For more information visit www.knaufinsulation.com

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.





ROADMAP FOR CHANGE



INNOVATION HONOUR



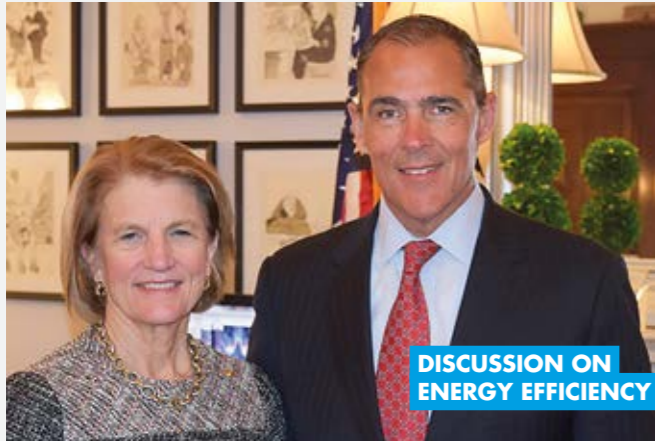
SOLAR POWER



CLOSING THE LOOP



CHILD'S PLAY



DISCUSSION ON ENERGY EFFICIENCY



ACADEMY SUCCESS

THE YEAR AT A



TWO TIMES FAVOURITE



QUALITY AWARD

ROADMAP FOR CHANGE IN SLOVAKIA

Vice-President of the European Commission's Energy Union, Maroš Šefčovič, was presented with an ambitious public policy roadmap designed to transform Slovakian buildings into energy efficient powerhouses that can help tackle climate change, provide sustainable healthier living environments and drive economic growth. The programme, presented by our colleague Peter Robl, Public Affairs Manager in Slovakia, was developed by Buildings for the Future (B4F) alliance which represents more than 140 companies with aggregated net sales comprising almost a third of the total construction output in the country.

BOOST EUROPE'S AMBITION FOR GREEN BUILDINGS

Knauf Insulation has called on European Energy Ministers to increase ambition on energy efficiency and green buildings. Speaking at the European Union Informal Energy Council in Malta in 2017, Jure Šumi, our Business Development Director for Green Solutions, told European Ministers: "There is a potentially enormous market for our Urbanscape® Green Solutions range, but this is not enough. Businesses look to the regulatory context as the main driver for future market development — and this is why having ambitious European targets is important."

WASHINGTON DC DISCUSSION ON ENERGY EFFICIENCY

The Save Act, designed to allow 'above code' energy efficiency investments to be considered in mortgage appraisals, was top of the agenda during Congress meetings in Washington DC attended by Knauf Insulation CEO North America, Christopher Griffin, and key executives. Senators Capito and Manchin also accepted invitations to attend the inauguration of the new production line at our Inwood plant.

NEW FIRE SAFE EUROPE PRESIDENT

Mark Leverton, Knauf Insulation's Managing Director for Western Europe, is the new President of Fire Safe Europe. "It is vital that the European Union champions policies that lead to fire-resistant buildings across Europe," said Mark.

ACADEMY SUCCESS IN SERBIA

More than 200 architects, construction engineers and specifiers from Serbia, Macedonia, Croatia, Montenegro, Bulgaria, Bosnia and Herzegovina attended the fifth Serbian Knauf Academy to discuss new trends in architecture and construction. Subjects included fire protection, soundproofing, new software tools and energy efficiency. The event was organised by Knauf Insulation, Knauf and Knauf AMF.

COMPANY NEWS

NEWS FROM OUR FACTORIES

AWARDS

SUSTAINABILITY

COMMUNITY

GLANCE

DOUBLE CELEBRATION IN UKRAINE

Knauf Insulation is celebrating two major awards in Ukraine after being chosen as the country's Best Thermal Insulation and Importer of the Year. The best insulation honour was presented during the independent Peoples Awards which recognises the country's best products and services in October 2016. The Importer of the Year 2016 was awarded in April 2017 by the independent National Business Rating which ranks companies according to their business levels of foreign trade.

FRENCH INNOVATION HONOUR FOR RT PLUS SYSTEM

Our RT PLUS System has won the 2017 Prix de l'Ingénierie (Engineering Award) which recognises outstanding contributions to innovation, engineering and sustainability. The award was voted for by contractors, journalists, engineers and building professionals.

GREENTAG BOOST

Our Earthwool range has again received GreenTag GreenRate Level A certification in April 2017 — maintaining its position as the only Glass Mineral Wool insulation in Australia and New Zealand to have a Level A rating. GreenTag is an independent sustainable product rating programme and its GreenRate certification is recognised by the Green Building Councils of Australia and New Zealand.

KNAUF INSULATION UK TWO TIMES FAVOURITE

Last November 2016, Knauf Insulation UK won the Supplier of the Year Award in the roofing and insulation category of the National Buying Group Awards for the fourth year running, while John Gaunt was named Account Manager of the Year for the second consecutive time: "At Knauf Insulation we believe in doing things differently, by investing heavily in training and engaging with our customers," John said.

CLOSING THE LOOP AT ST HELENS

Knauf Insulation has entered into a contract with resource management company Veolia to support the building of a glass cullet processing facility next to our St Helens plant in the United Kingdom.

Built and operated by Veolia on Knauf Insulation land, the facility will create 18 new jobs and be used to provide the plant with a stable supply of tens of thousands of tonnes of high quality recycled glass from packaging.

SOLAR POWER ENERGISES VISÉ

A total of 920 solar panels have been installed on our warehouse building at Visé in Belgium. With a total capacity of +/-250 kW peak power, the panels should produce enough capacity to power the multi-packaging system zone.

COMMUNITY ACTION IS CHILD'S PLAY

A kindergarden play area has been transformed thanks to our colleagues at Krupka in Czech Republic. Old trees and faulty play equipment were removed from Zvoneček school in Krupka and replaced. New trees were purchased and planted thanks to money and time volunteered by the plant and support for the new equipment and its installation was raised in partnership with plant suppliers. In 2011, Krupka transformed another local kindergarden play area after raising €65,000.

QUALITY AWARD FOR LANNEMEZAN PLANT

Our Lannemezan plant in France has received the Association Française Qualité Performance Award (AFQP) for its Continuous Improvement training programme. The programme was based on the European Foundation for Quality Management and the new version of the ISO9001 standard. AFQP recognises industrial excellence by encouraging the sharing of best methodologies and experiences.

VISION OF AMBITION

KNAUF INSULATION'S CEO JEAN-CLAUDE CARLIN JOINED THE GROUP IN FEBRUARY 2017. WE SPOKE TO HIM AT KNAUF INSULATION'S NEW GLOBAL HEADQUARTERS IN VISÉ, BELGIUM, ABOUT HIS UNCOMPROMISING APPROACH TO HEALTH AND SAFETY, AMBITIOUS PLANS FOR FRESH MARKETS, DEVELOPING NEW INNOVATIVE SOLUTIONS AND INCREASING CAPACITY TO MAXIMISE AN EXCITING NEW ERA OF OPPORTUNITY.



From left to right:

DAVID DUCARME
Group Chief Operating Officer and Deputy CEO

JEAN-CLAUDE CARLIN
CEO Knauf Insulation Group

FRÉDÉRIC DESLYPERE
Group Chief Financial Officer

SAŠA BAVEC
Group Marketing Director & Managing Director OEM

CHRISTOPHER GRIFFIN
CEO North America

WHAT ARE YOUR KEY PRIORITIES?

My first task when I became CEO in February 2017 was to understand our markets and by this I mean understanding what more we can do for our customers and how we can provide greater value. This is a global company but each market is different so it is vital that our regions have the autonomy and entrepreneurial spirit they need to move quickly.

AND WHAT ARE CUSTOMERS IN THESE DIFFERENT MARKETS SAYING?

I have met with customers at all our key locations around the world. There are different national needs and there are gaps we have to explore if want to be better in future in terms of service, product application and the range of what we do. There are a lot of opportunities where we want to go at speed.

SUCH AS?

We are preparing ourselves for expansion. We are examining our product range, developing new solutions and building up a strong footprint.

HOW IS THIS BEING DONE?

At the end of 2017 we will have restarted a mothballed line in Visé in Belgium and upgraded our line at St Egidien in Germany. This is not just a capacity game, we are rebuilding the performance of the lines and introducing new improvements so that processes and quality are superior and we are more efficient. We want to increase our pace of growth but want to do so in a way that is profitable for our shareholders and reinforces the quality of our solutions.

AND KNAUF INSULATION IS EXPLORING NEW MARKETS?

Of course. Asia offers very exciting opportunities for geographical expansion. There are also some very exciting opportunities in Europe. Regions with strong regulatory frameworks are always interesting for us as they provide long-term certainty for our markets – something all businesses appreciate. This is why we have a specialist team in Europe working on this for us.

HOW QUICKLY CAN KNAUF INSULATION MAKE THE MOST OF THESE OPPORTUNITIES?

We are a family-run business and family-run businesses traditionally have a speed of reaction that is faster than anyone else. We also have an unwavering entrepreneurial spirit and this has helped the company grow to a multi-billion-euro global business in just a decade. Knauf Insulation has always taken the opportunity to propose something different to our customers and because we have a robust basis and are family owned we are able to finance innovation and rapidly enable capabilities.

ARE THERE ANY NEW PLANTS PLANNED?

Yes. We have announced our intention to invest in a new Rock Mineral Wool plant in the border region of Luxembourg and France. The new plant, which is set to start operating in mid-2019, will have a production capacity exceeding 110,000 tonnes and will create close to 120 new local jobs.

WHAT ARE THE CHALLENGES FACING THE COMPANY?

We cannot just observe the market, we must drive it. We need to build up a strong footprint and continue to identify new market segments. We also need to bring something different to customers. And we need to challenge ourselves to provide innovation and new services as well as demonstrate the performance that our solutions deliver.

WHAT ABOUT NEW INNOVATIONS?

Internally we have seen good ideas from colleagues become fantastic new innovations, this is a culture we have always nurtured. In fact, these ideas have led to some of our most exciting innovations such as our award-winning ECOSE Technology, Mineral Plus and Urbanscape® Green Roof Solutions. We will continue this approach and continue to bring great new ideas to the market because our customers expect it and we enjoy it.

HOW DO YOU SEE THE FUTURE OF THE INSULATION INDUSTRY?

Our future is about systems. Our job is to provide superior insulation solutions and prove that these solutions are high performing. We are moving from being a manufacturer that 'just' sells rolls or slabs of insulation towards selling and guaranteeing performance.

HOW IMPORTANT IS SUSTAINABILITY TO THE COMPANY?

A commitment to sustainability is the only way forward for Knauf Insulation. It is critical that we help provide solid solutions that reduce the impact of the built environment on the environment and the world's natural resources. In parallel we are pushing ourselves to do better with less and constantly improving our processes and our use of resources. It is fantastic to be working toward such an objective and we have some incredibly committed colleagues. I must admit this is one of the things that most attracted me to this job.

HEALTH AND SAFETY IS A PARTICULAR PRIORITY FOR YOU.

Absolutely. When it comes to safety even our best is not good enough. You can't create a culture of care if you don't have a safe environment. Accidents still happen and that is devastating. Safety is an attitude and management has to encourage this attitude and people have to be responsible for their safety. We cannot allow things to go wrong with our processes or standards. This is an issue where I intend to be uncompromising. I think this is clear to everyone.

WHAT EXPERIENCES HAVE PREPARED YOU FOR YOUR ROLE AS CEO OF KNAUF INSULATION?

Before I joined Knauf Insulation I was in the steel business working for an American company. For more than half my career I worked in many different positions in many countries – China, India, UK, US. I learned to adapt as I started up different businesses in different environments and these experiences helped develop an entrepreneurial style.

WHEN YOU JOINED THE KNAUF GROUP WHAT DID YOU LEARN?

I joined Knauf Industries in 2009 as Group CEO of the packaging plastic division which required a lot of adaptation and good know-how because the business was smaller. This was a great education that I could also apply to a bigger role. Today all these experiences have come together and it's fantastic to have the possibility once in a lifetime to 'finish up the house and now put on the roof'.



BUILDING BETTER REGULATION

Knauf Insulation has always campaigned to improve energy efficiency policies for buildings. Why? Because regulation drives positive change.

King Hammurabi didn't have time for dangerous buildings, so he wrote the first building code. And it got to the point quickly.

"If a builder has built a house for a man and his work is not strong, and that house falls and kills the householder, that builder shall be slain."

Harsh but fair? Perhaps. But this was Babylon in 1758 BC. And such a Directive would have certainly 'incentivised' the industry to seriously consider best practice, real performance, safeguarding customers and making life better for everyone who uses buildings.

Almost 4,000 years later, incentivising building improvement through new policies is more important than ever. That is why at Knauf Insulation we campaign to upgrade and improve building laws at every level across the world — although with a more liberal approach than King Hammurabi.

"Our focus has always been on driving regulation that improves the energy efficiency of buildings because — simply — this makes everything better, for everyone," says Siân Hughes, our Director of External Affairs.

"Naturally, regulation also inspires and drives change. If tackling issues of energy efficiency were left to the market, well, not enough would be done, at least at the rate needed. Regulation puts a rocket behind the concept."

The impact of relentless campaigning with our industry partners and other energy efficiency stakeholders combined with greater public and political awareness has been particularly successful in Europe.

A few decades ago, energy efficiency was barely a footnote in European energy policies. Today it is at the

core of the 'Clean Energy for All Europeans' package of measures designed to reduce energy use by 30% by 2030.

The concept of 'Energy Efficiency First' plays a critical role in Europe's Energy Union strategy and energy efficiency is regarded as a key way in which Europe can safeguard its commitment to the Paris Agreement to keep global warming 'well below' 2°C by 2050.

Europe has come a long way and at Knauf Insulation we want to drive the energy efficiency agenda even further. King Hammurabi would certainly approve.

THE RISE AND RISE OF BUILDING ENERGY EFFICIENCY IN EUROPEAN POLICY

1993

The Directive to Limit Carbon Dioxide Emissions by Improving Energy Efficiency (known as SAVE) called on Member States to limit emissions by implementing programmes that focused on the energy certification of buildings, the billing of heating and cooling costs based on consumption, the thermal insulation of new buildings and energy audits of high industrial energy consumption.

2002

The first Energy Performance of Buildings Directive (EPBD) is inspired by the need to manage building energy use in line with the Kyoto Protocol to curb emissions. The word 'efficiency' is mentioned nine times in the Directive and topics focus on air-conditioning, boilers and heat pumps, rather than the building envelope.

2010

The revised EPBD sets — for the first time — a target that new buildings must be nearly zero-energy by 2020. The word 'efficiency' now appears 43 times. Unfortunately, renovation of the existing building stock is only marginally tackled in the Directive. As a result, the building industry launches the Renovate Europe Campaign in 2011.

REGULATION DRIVES IMPROVEMENT

"Now, thanks mainly to regulation or policy, when the moment comes to do a renovation or to buy a new television, the new version uses less energy than the one it replaces. Through the Energy Performance Building Directive, for example, policy makers have the tools to ensure that when buildings are renovated they are renovated to a good level."

Paul Hodson, Head of the European Commission's Energy Efficiency Unit.

2012

The first Energy Efficiency Directive (EED) sets an energy efficiency target of 20% by 2020 for all Member States — to improve energy security, reduce emissions, create jobs and boost innovation. The bad news is that it's not legally binding. The good news is that for the first time, renovation is mentioned with countries having to create tri-annual 'roadmaps' to show how they will make their building stock more energy efficient.

2014

The European Council agrees on the 2030 climate and energy policy framework for the European Union setting a target of at least 40% in greenhouse gas emission reduction for 2030 and European Commission proposals state Member States must improve their energy efficiency by 27% by the same year.

2015

The European Commission presents the Strategy Framework for the Energy Union. At its heart is the principle of 'Energy Efficiency First' ensuring energy efficiency comes before the exploration of new energy sources.

— The world commits to the Paris Climate Change Agreement to keep warming well-below 2°C.

WHERE NEXT?

OUR TARGETS

The 'Clean Energy for Europeans' package was launched by the European Commission in the Autumn of 2016 and is an impressive set of proposals that could commit the European Union to a 30% binding efficiency target by 2030 and launch an ambitious rate of building renovation backed by significant 'smart' financial support.

OUR WORK

We have been supporting politicians and policy-makers with practical expertise and experience to ensure the Clean Energy Package delivers the best possible deal for energy efficiency in buildings. We are also working to make the package's revisions of the EPBD and EED focus on requirements that double Europe's renovation rate.

TESTIMONY

"It is great to work with Knauf Insulation. Along with other members of the European Alliance to Save Energy they have been at the forefront of our campaign for energy efficiency in Europe since the creation of the Alliance back in 2010. They are an excellent example of why green business is good for Europe, for European citizens but most importantly for the future of our planet."

Monica Frassoni, President of the European Alliance to Save Energy

KEEPING ENERGY EFFICIENCY AT THE HEART OF THE DEBATE

THE WORLD'S POLITICAL POWER PLATES MAY BE CONSTANTLY SHIFTING, BUT THE OBJECTIVE OF OUR PUBLIC AFFAIRS TEAMS HAS ALWAYS REMAINED THE SAME — ENERGY EFFICIENCY SHOULD BE THE FOUNDATION OF ANY ENERGY POLICY.

“May you live in interesting times,” goes the well-worn quote. And during 2016 and 2017, it has felt that ‘interesting times’ could be interpreted as either a blessing or a curse — depending on your view.

The fall out from the UK's decision to leave the European Union and the impact of nail-biting elections in the US and across Europe reverberated around the globe as populist movements and political earthquakes became the hallmarks of current times.

But, of course, politicians and their policies come and go. At Knauf Insulation we have always maintained that consistency is the key to real progress. Especially when it comes to those policies that matter most.

Our focus on energy efficiency has never been stronger. Energy efficiency improves living conditions, cuts emissions, creates jobs, boosts economies and ends fuel poverty.

NO MATTER HOW THE POLITICAL POWER PLATES SHIFT, OUR VISION FOR THE FUTURE HAS ALWAYS FOCUSED ON MAKING BUILDINGS ENERGY EFFICIENT. THAT IS WHY OUR PUBLIC AFFAIRS CAMPAIGNERS ARE WORKING RELENTLESSLY TO PUT ENERGY EFFICIENT BUILDINGS AT THE HEART OF EVERY POLICY DISCUSSION.

USA

STRENGTHENING ENERGY CODES

The US Department of Energy states that energy codes for residential and commercial buildings over a 30-year period from 2010 to 2040 should save the USA \$126 billion in energy cost savings and the annual emissions equivalent of 177 million passenger vehicles. Our aim in the US is to ensure these codes significantly enhance energy efficiency and are practical to implement when applied to residential and commercial construction.

We also want to increase International Energy Conservation Code (IECC) compliance across the entire country. According to data from the Building Codes Assistance Project, nine states do not have a state-wide code; one is less energy efficient than 2009; 16 have a code equivalent to 2009 and 23 states are between 2102/5 codes and just one is more energy efficient than the 2012/5 code.

OUR WORK

We have consistently — and successfully — campaigned for higher R-values during revisions of the IECC. Under the latest code update for 2018 we along with our trade allies successfully established minimum envelope levels which were 15% more efficient than proposed changes. Critically, we also ensured these values were the basic minimum even if a builder installed solar panels.

UK

TAKING ON THE PERFORMANCE CHALLENGE

We are building on the evidence base around the importance of more efficient building stock and providing government with solutions that will drive building efficiency. In 2017 we analysed data collected from 70 homes — both insulated and uninsulated — in the Energy Performance Challenge project over two heating seasons.

OUR WORK

It is vital that renovation is carried out to a high standard and that means incentivising good ‘whole house’ solutions where walls, roofs and floors are insulated where appropriate. Knauf Insulation also piloted a project training a multi-skilled team outside of the traditional supply chain to deliver its core domestic home renovation products along with complimentary ventilation solutions. Thanks to our data from both this project and the Energy Performance Challenge the government has the opportunity to revisit the benefits it would receive from a new building energy efficiency initiative.

GERMANY

AIMING HIGHER FOR HOUSING

Germany's housing market is under increasing pressure as a result of soaring prices, a lack of affordable property and the unique challenge of finding homes for hundreds of thousands of refugees. Estimations of the German government suggest that 350,000 to 400,000 new homes need to be built every year until 2025 to meet demand. The country is falling short of that annual target by 130,000.

OUR WORK

The Knauf Group and Knauf Insulation are committed to finding innovative inner-city solutions to the crisis particularly the possibilities of creating new homes through vertical extensions to existing buildings.

A study by Technische Universität Darmstadt and Pestel-Institut in Hanover found that across Germany's major cities an additional 1.1 million new lightweight apartments could be added to the top of 580,000 existing buildings built between 1950 and 1990. The initiative would not require expensive new building plots and would provide affordable, low-energy homes that could be easily integrated into residential blocks, providing new jobs for thousands. Our public affairs teams are working to encourage policy makers to find the financial incentives to make this roof-top initiative a future reality.

CZECH REPUBLIC

UNLOCKING FINANCE FOR BUILDINGS

We are campaigning to increase renovation rates across the Czech Republic and supporting the government's introduction of subsidies that pave the way for more energy efficient buildings.

OUR WORK

We are working hard to ensure that a multi-million-euro government programme for the renovation of single-family homes is a success. And progress is promising. Already the scheme is recognised as an exemplary programme for the entire Central and Eastern European region. Now we are setting our sights on unlocking renovation finance for other building types as well.

We have also helped find new sources of finance for the installation of green roofs. A campaign by Chance for Buildings, which we supported, resulted in the government introducing a new subsidy which cuts green roof costs by half.

Additionally, we have been working with the Mineral Insulation Manufacturers Association (AVMI) to showcase the acoustic and financial benefits of using lightweight partitions with Mineral Wool.

SLOVAKIA

REMOVING BARRIERS TO RENOVATION

In 2016 we set out to overturn a 2015 law that effectively added a ‘development’ tax of up to €35 per square floor-metre on renovation work and new buildings; improve building fire safety; help drive subsidy schemes for the renovation of single-family buildings and support new norms that will allow fire-safe timber buildings of up to five storeys.

OUR WORK

After six months of campaigning parliament, we were able to demonstrate how the tax would add 30% to the cost of energy efficient improvement work as well as act as a disincentive to renovation. The law was overturned.

Intense campaigning also resulted in the introduction of compulsory 20 cm fire barriers in insulation of all existing buildings under 22.5 metres.

Another renovation breakthrough has been new guidance by the European Commission which now unlocks the renovation of public buildings using private funding via Energy Performance Contracting. The new rules have removed the negative impact of such funding on public deficit for Europe's local authorities. The breakthrough follows an initiative by several governments heavily supported by a campaign led by our Slovak and EU public affairs team.

TESTIMONIES

“Knauf Insulation is among the leading promoters and supporters of sustainable buildings in Slovakia. Our Council benefits from their active participation in our Board and from the advocacy work of the Buildings for the Future platform initiated by Knauf Insulation. I appreciate their approach based on building alliances and promoting constant development.”

Pavol Kukura, Chairman of the Board, Slovak Green Building Council.

“The ability of the Green New Saving programme to respond to changing trends is due to constant collaboration with specialists and associations such as Chance for Buildings. Working with individuals such as Ondřej Šrámek, a member of the Board of the Czech Green Building Council, has helped make the programme one of the most successful and interesting initiatives in the whole of Central and Eastern Europe.”

Richard Brabec, Environment Minister of Czech Republic.

FATAL FLAW OF REGULATION

When it comes to building safety, how fire reacts in the real world is all that matters.

The Grenfell Tower tragedy in London has once again put fire safety in the spotlight.

For years Knauf Insulation has supported organisations such as Fire Safe Europe as well as many national campaigns to fight for better building fire safety regulation.

But building fires continue to devastate lives across the world with the Grenfell disaster in the UK in June 2017, the latest in a terrible legacy of tragedy.

In 2012, 19 people including 13 children were killed in a fire that swept through a Qatar shopping mall. A year later, 242 were killed in a nightclub fire in Brazil. In 2014, 32 pensioners died in a blaze in a Canadian care home.

In the United Arab Emirates (UAE), there have been five fires in towers over a height of 34 storeys since New Year's Eve 2015 when a blaze engulfed a 63-storey hotel.

Incredibly, in August 2017, fire swept up one of the world's largest residential buildings, the Torch Tower in the UAE emirate of Dubai, for the second time in two years.

"These terrible incidents and the shocking tragedy of the London Grenfell disaster reinforces our conviction at Knauf Insulation that the right solution for the right application is vital to create a safe and sustainable built environment," says Siân Hughes, Knauf Insulation's Director of External Affairs.

"However, to make such an environment a reality it is essential that the entire building chain is driven by robust regulation. And that means designing the risk of fire out of buildings from the start."

This approach, encouraged by Knauf Insulation and its building fire safety network, is gathering momentum.

In the UAE, a new building code introduced in 2017 means that any insulation in a façade must be non-combustible on any building higher than 15 metres as well as in other public buildings such as malls, theme parks, schools and hospitals. In the Czech Republic and Slovakia, only non-combustible — or materials with limited combustibility — can be used on facades in high-rise buildings. Serbia now requires the installation of non-combustible materials in the facades of all public buildings regardless of height.

Such regulation is highly prescriptive defined by a specific approach to achieve a very specific aim. But what about countries such as the UK where fire regulations are based on lab performance and where extensive testing on products, kits and systems establish how a combination of materials are expected to perform in a fire?

We put real performance at the heart of everything we do because it is the reality by which all buildings will be judged in the future. That is why we invest heavily in research and development, both in testing facilities and ground-breaking 'real world' projects, to understand how our solutions will perform when it comes to thermal and acoustic performance.

But the question has to be asked: has real performance testing reached its limit when it comes to using it as a basis for building fire safety regulation?

"No matter how sophisticated the technology and no matter how extensive the scale or range of modelling research, it is impossible for a test facility to assess the endless factors that could impact how a high risk large building will react in the event of a fire in the real world," says Siân.

It is an opinion shared by Phil Barry, Managing Director of CWB Fire Safety Consultants in the UK and a member of the Institution of Fire Engineers.

"We must design this risk out of these buildings and that means only permitting non-combustible materials in these buildings from the start."

He says: *"Fire tests that are recommended in the UK do not ensure that all aspects of modern building construction are scrutinised and the test methods are not appropriate for modern high-rise building situations."*

Issues such as poor installation workmanship, unexpected environmental factors, unpredictable occupant behaviour or simply the impact of ageing that chips away at buildings through constant modification could all further increase fire risk.

"Another major issue that appears to be often over-looked is the fact that building codes around the world permit the use of unprotected areas — i.e. windows — in external walls, with the size and number permitted dependant on the proximity of neighbouring buildings to reduce the risk of fire spread between buildings by radiated heat," Phil says.

"So we have many situations around the world where buildings have combustible outer walls with unprotected areas which may result in rapidly spreading fire across buildings and into them from the outside."

But at the heart of the debate is the emphasis placed on fire tests. *"For high-rise buildings or for any other building where evacuation is slow or difficult in the event of a fire — such as schools, hospitals or care homes — building fire safety cannot be left to regulation based on results from test facilities because the real-life risks are too high,"* says Siân.

"We must design this risk out of buildings and that means only permitting non-combustible materials in them from the start."

Because when it comes to building safety, how fire reacts in the real world is all that matters.

FIRE REACTION VS FIRE RESISTANCE

What is the difference between fire reaction and fire resistance?

Reaction to fire describes the combustibility of a material – whether it will burn or not – and fire resistance describes how building elements are expected to behave in the event of a fire.

How is fire reaction defined?

There is a clear definition of a product's reaction to fire and it comes from seven levels of combustibility based on tests for the EN13501-1 European Standard. These 'Euroclasses' start at A1 (non-combustible and doesn't burn) and A2 (limited combustibility) and go down to B, C, D, E and F.

Does that mean the protection offered by non-combustible materials varies?

Yes. Tests for A1 and A2 products are designed to show a product is non-combustible, while for the other classes the tests are all about degrees of combustibility. You will know what the Euroclass reaction rating is because it is included on a product's CE Mark. This is a marking demonstrating compliance with the European Construction Product Regulation (CPR) and testing according to the European Standards.

Knauf Insulation products are A1 and A2?

We offer a wide range of A1 and A2 fire-safe insulation solutions for all building applications from Rock Mineral Wool slabs, Glass Mineral Wool rolls and slabs, to Heraklith boards. These products have exceptional fire reaction and fire resistance.

What about fire resistance?

Fire protection classifications are normally reported in terms of a period of fire resistance, for example 30, 60 or 90 minutes. These classifications relate to what is known as the integrity, thermal insulation and load-bearing capacity of building elements. Simply, this means how elements – either in combination or individually – stop a fire spreading, how they restrict temperature rise and how the elements' loadbearing capacity is maintained. The ideal approach would be to have excellent fire reaction materials combined through intelligent system design to give excellent fire resistance in a building element.



NEW FAÇADE REGULATION IN SERBIA

New regulation has been introduced in Serbia that requires the installation of non-combustible materials in the façades of all public buildings regardless of height.

Since 2012, Knauf Insulation and the National Association for Fire Protection (NUZOP) have been campaigning to generate greater awareness of how easily fire can spread through building façades featuring combustible materials as well as highlighting the dangers of toxic gases.

The campaign was given added momentum by nation-wide renovation programmes designed to make public buildings – particularly schools and hospitals – more energy efficient. At the heart of these works it was vital that fire safety was made a priority.

The new law marks a major step forward for Serbia and covers public renovation projects as well as new public buildings and a range of other building types. The previous regulation on facade material use dated back to 1984 and was only for buildings above 22 metres.



UAE CODE PUTS SAFETY FIRST

New building codes in the United Arab Emirates (UAE) have placed strong emphasis on fire safety following dramatic blazes in high profile buildings in Dubai, Abu Dhabi, Sharjah and Ajman.

Knauf Insulation has consistently campaigned for non-combustible façades in UAE buildings and in 2016 new regulations were introduced in a 780-page Building Code.

Now any insulation in a building façade must be non-combustible on any building higher than 15 metres as well as in public buildings such as malls, theme parks, school and hospitals.

Secondly, everyone in the supply chain – from manufacturers and contractors to specifiers and clients – is responsible for ensuring all cladding system elements have been tested and certified in line with the new fire safety regulations.

Finally, any HVAC elements that contain combustible elements must be encased in non-combustible material.

“The building ambition of the UAE has been extraordinary. In just 40 years the country has created iconic skylines out of desert sand,” said David Adams, Managing Director Knauf Exeed. *“Now the authorities have created a serious and comprehensive code that reflects the scale of this ambition.”*

LEADING THE CHARGE FOR BETTER FIRE SAFETY

Knauf Insulation is a founding member of, and presides over, Fire Safe Europe (FSEU), an organisation dedicated to improving fire safety in European buildings. FSEU aims to create awareness among policy makers about building fire safety; publicly share expertise from fire-fighters, fire experts, associations and product manufacturers; create a platform for the sharing of ideas about fire safety; advocate for regulation that reflects real performance in a fire and build a network that can make Europe fire safe.

TIMBER-FRAME SUCCESS IN SLOVAKIA

In Slovakia our public affairs team supported national partners to help drive through a technical norm that allows timber-frame buildings to be constructed to a height of up to five storeys. The new regulation replaces codes that previously only allowed timber frame construction up to a height of two storeys. A key condition of the new regulation is that these buildings must be fire-safe – our Mineral Wool offers the ideal solution for the frame to be filled with incombustible material.



FIGHTING FIRE IN HVAC SYSTEMS

Fire safety is the greatest challenge facing any public building and that is why our Technical Solutions division offers fire resistant HVAC solutions that are customised to meet the strictest regulation.

Preventing fire spreading room to room through a building via HVAC systems is a key consideration of specifiers and it is vital that these systems not only block fire but also offer the highest fire resistance.

Our specialists are expert in the wide range of HVAC fire regulations that differ considerably from country to country and – whether an HVAC system uses circular, rectangular or pipe connections – we have effective fire-resistant solutions that can be tailored to fit and meet all standard requirements.

Building on this success we continue to work to develop new HVAC insulation solutions. For example, we recently launched our HVAC Fire-teK system in Switzerland and Finland following certification that met the country's highest fire standards. We are also developing specialist solutions for ships that, unsurprisingly, have to meet some of the toughest fire resistant classifications in the world.

At Technical Solutions, we are also committed to environmental care. All HVAC systems feature our revolutionary ECOSE Technology, which is a binder mainly derived from rapidly renewable materials and with no added formaldehyde. It is also certified Indoor Air Comfort Gold by Eurofins in line with demanding Indoor Air Quality emissions regulation.

“The EU Framework of Core Indicators, Level(s), has just been published. Level(s) is the result of more than two years of combined effort by many construction stakeholders, including valuable input from Knauf Insulation. The next step is to fully implement a test phase and we call on the whole chain to show passion and commitment to create an ambitious long-term vision for a better sustainable built environment in Europe.”

Josefina Lindblom, Unit of Sustainable Production, Products and Consumption, European Commission for DG Environment

A new vision for green building

How Knauf Insulation can help specifiers make the most of the European Commission's new sustainable building framework.

2017 is set to be a landmark year for sustainable building with the launch of a European Commission framework, Level(s), that could pave the way for new environmental performance laws for Europe's buildings.

The framework Level(s) will “develop indicators to assess environmental performance throughout the lifecycle of a building and promote their use for building projects”.

The good news is that at Knauf Insulation we are familiar with every element of this framework which focuses on the environmental impact of building components — from cradle to grave — on energy performance, climate change impact, resource efficiency, water use, indoor air quality and lifecycle costing.

We have always championed a lifecycle assessment approach to our products, because it provides the most accurate available insight into issues of sustainability.

We have third party validated Environmental Product Declarations (EPDs) for the majority of our products and when verified EPDs are not available, dedicated Life Cycle Assessment documents for specific products can be delivered in a few days.

Vincent Briard, Sustainability and Product Regulatory Affairs Director at Knauf Insulation, said: “We welcome the Commission's Framework as a major step forward for improved construction practices and we hope that in the long-term it will form the initial foundations for an ambitious Environmental Performance of Buildings Directive in the future.”

“At Knauf Insulation we have long campaigned for a lifecycle assessment approach to sustainability and we believe such a directive would be good for the industry and innovation, good for people and ultimately good for the environment.”

And, of course, for specifiers who want to navigate this new framework we can help. Most of our products can make a significant contribution to all its key criteria. We also have an experienced in-house team of sustainability experts to support our customers as well as tools, such as KnaufTerm software, to dive deep into energy use and environmental impact across the lifecycle of products.

“We look forward to working with specifiers to provide the best possible solutions whatever the scope and scale of their projects,” said Vincent.

How we are helping specifiers prepare for Level(s)

ENERGY PERFORMANCE

Energy use is the cornerstone of sustainability and the cornerstone of the Commission's framework. Our products are designed to save energy and money. Even better, our calculations reveal that one unit of energy used to manufacture one unit of our typical Glass Mineral Wool saves 570 energy units over its assumed 50-year use phase.

CLIMATE CHANGE IMPACT

The framework is inspired by the European Union's legal commitment to the Paris COP21 agreement to make on-going emission reduction commitments. As buildings are the biggest consumers of energy accounting for 40% of Europe's energy use and 36% of its emissions, our products can reduce emissions significantly over the lifetime of a building. Based on this assumption, our Glass Mineral Wool installed in 2016 reduced energy consumption in Europe's buildings by approximately 1.5 billion kWh. Lifecycle Assessment calculations show that the emissions generated during the manufacture of these solutions were offset within months of installation.

RESOURCE EFFICIENCY

Products such as our Glass Mineral Wool with ECOSE Technology are made from up to 80% recycled glass. Environmental Product Declarations (EPDs) also examine in minute detail every stage of our products' lifecycle from material sourcing to disposal or recycling and enable us to examine new ways to do more with less.

WATER USE

Vegetated roofing has long been recognised as an effective stormwater management tool in cities to help with storm water management. Our Green Roof Solution Urbanscape® can reduce storm water run-off, which reduces the burden on sewer systems by 70-95% in summer. Through natural bio-filtration, green roofs can also prevent contaminants and toxicants from reaching streams and waterways.

INDOOR AIR QUALITY

The framework's emphasis on improved air quality is a reflection of a wider focus on the health and well-being of buildings as an important indicator of good sustainable practice. Knauf Insulation with ECOSE Technology is certified Indoor Air Comfort Gold from Eurofins which meets Europe's most demanding indoor environmental standards such as Blue Angel and A+ labelling in France.

ACOUSTICS

We are delighted to see that acoustics found place in the first version of the framework. At this stage it is just indicative, but we are confident that it will become more important with the growing realisation of its impact on the well-being of building users. The majority of our products provide exceptional sound absorption performance and dramatically reduce the unhealthy impact of noise pollution.

LIFECYCLE COSTING

Lifecycle Costing evaluates the economic impact of an asset from the cradle to the grave. Our sustainability team understands the importance of integrating LLC into project management and also the critical role our products can play. Our solutions are affordable and designed to cut operational energy costs over their lifecycle.

FIVE REASONS WHY THE NEW EUROPEAN FRAMEWORK LEVEL(S) MATTERS

The impact of buildings is unacceptable

1 During their lifecycle European buildings pump out 36% of Europe's CO₂ emissions, consume half of all extracted materials, use 40% of Europe's energy, consume a third of its water and generate a third of all waste.

There is a need to drive improvement

2 The Commission describes the initiative as “a voluntary reporting framework that has a broad potential for use by building sector professionals across the EU” and is rigorous enough to drive improvement in performance and allow comparison between buildings.

Buildings need to be more sustainable

3 Buildings have long lifetimes and it is vital that innovations are encouraged that will help reduce the environmental impact of building components as well as increase their durability and recyclability.

Paris commitments are binding

4 The European Union is among the 197 parties that signed the Paris Agreement to keep global temperature rise this century well below 2°C. The Framework contributes.

Other countries are not waiting

5 Many countries are already putting the environmental impact of buildings at the heart of legislation such as in France where Fiches de Déclarations Environnementales et Sanitaires (FDES) — are mandatory on construction products. The declarations also insist on building indoor air quality and introduce a new French label system E+C- for new buildings which stands for positive energy and carbon reduction. In Finland the government is looking at implementing mandatory LCA of buildings by 2025, while in Austria subsidies are allowed if an LCA is conducted for a building and a reference target achieved.

For more details about the European Commission framework visit ec.europa.eu

OUR GREEN TEAM

At Knauf Insulation our technical specialists offer a wide range of Green Building Rating System expertise from LEED and BREEAM to DGNB, HQE and WELL. For specifiers who need support to navigate the growing complexities of these systems we are here to help.

As the popularity of Green Building Rating Systems (GBRS) continues to grow, their scope is becoming increasingly more sophisticated.

This is good for everyone, because it sets more demanding green building standards for specifiers, encourages manufacturers to create more sustainable products and means better buildings for everyone.

There are more than two billion square metres now certified in the world by the 'big five' GBRS worldwide, and as their influence has grown these schemes have continuously evolved and upgraded their criteria with the aim of exceeding current and future building regulations and including more responsible practices.

According to new research by the European Insulation Manufacturers Association (Eurima), the scope of GBRS now extends far beyond narrower 'green' concepts of 15 years ago into issues such as acoustic performance, indoor air quality, sustainable sourcing, building life-cycle impacts, life-cycle costing, construction and demolition waste management without minimising energy efficiency and thermal comfort aspects.

In other words, as GBRS continue to shape the construction landscape they are also becoming more "well-being focused", more "performance-oriented" and more "life-cycle centred".

Specific trends highlighted by the Eurima research included issues such as real performance compared to design performance; encompassing broader corporate responsibility issues such as sustainable sourcing and ethics as well as zero impact or positive impact on the environment particularly when it comes to carbon, energy and water.

"Step by step, we have seen the rise of GBRS which have a more holistic approach at building level – and even neighbourhood level – by the inclusion of, for example, indoor air quality or acoustic issues," says Jean-Pierre Pigeolet, Knauf Insulation's Products & Buildings Sustainability Manager, who is also a licensed BREEAM assessor and DGNB Consultant.

"Our focus on Lifecycle Assessments at Knauf Insulation has also paid dividends as GBRS are now pushing to reach the upper level of a global building LCA through the development of new criteria such as in the case of LEEDv4."

Naturally, these evolutionary changes create a challenge for specifiers because they have to ensure they have the expertise available to maximise their points potential.

SO, HOW CAN KNAUF INSULATION HELP?

We have upgraded our expertise to help specifiers maximise their GBRS points potential at every level. We have a team of trained GBRS Assessors who speak the language of BREEAM, LEED, DGNB, WELL and HQE fluently.

"A LEED project sees the key to its success in sharing knowledge and skills, teamwork and effective collaboration. A vital role is given to manufacturers who, in addition to providing products that meet the technical and aesthetic features of the project, have to face many requests from contractors such as tests, declarations and certificates attesting the sustainability criteria of their products in relation to the LEED credits of the project. Our experience with Knauf Insulation was great, not only due to the quality of their products, but also for the support that their technical experts provided to designers and contractors."

Paola Moschini, Architect and LEED Accredited Professional (AP), Macro Design Studio srl, Italy

ITALY

Francesco Cavicchioli, Knauf Insulation's Product Manager Walls & Facades in Italy, LEED expert

GREEN BUILDING DEMAND IS GROWING IN ITALY

In Italy we are getting more and more requests for LEED and BREEAM. These requests are mainly from foreign investors in Italy and there is an increase in demand. In February 2017 the government introduced a new mandatory version of the Minimum Environmental Criteria (CAM) for new public buildings or their renovation which, for example, insists on minimum energy performance and that recycled materials must make up to 15% of the weight of all materials used.

SUPPORT FOR SPECIFIERS' NEEDS

The conversations I have with specifiers vary according to their requirements, but my ability to understand how the green systems work and how we can contribute means I communicate on a specialist level. Specifiers are always interested in Knauf Insulation's LEED and BREEAM factsheets that show how we contribute points.



NEW LEED SHOPPING CENTRE PROJECT

The new 4,500 m² three-level Coop of Formigine shopping centre has been designed, built and inaugurated in line with the parameters of the 'LEED for Retail' protocol and certification is in progress. The high-performance envelope has been insulated with Knauf Insulation Rock Mineral Wool.



THE NETHERLANDS

Mariëtte Willems, Technical Product Manager and BREEAM-NL expert

SUBSIDIES BOOST GREEN BUILDING RATE

Since 2009, the number of BREEAM NL projects registered with the Dutch Green Building Council has increased every year. One of the reasons is that investors get subsidies for green building. We are also seeing campaigns focused on wider aspects of green building such as air quality in schools.

TEAM WORK TO SUPPORT PROJECTS

As an expert in BREEAM-NL, I get questions all the time about certification and how to collect credits. Also, we work with Knauf Gypsum to provide what is known as KnaufZeker which guarantees system performance. This means we can support customers at the important early stages of projects and for aspects such as noise reduction or materials – mentioned in BREEAM.

FIRST BREEAM EXCELLENCE HOSPITAL

Haga Hospital, which has more than 3,700 employees, is the first hospital in The Netherlands to achieve BREEAM Excellent certification. Achieving optimal sound insulation was critical and this is why our Acoustifit system with ECOSE Technology was chosen. It contributes to good indoor air quality, consists of 80% recycled glass, provides 30 minutes of fire resistance and reduces noise by 52 dB. A total of 11,000 m² of insulation was provided by Knauf Insulation including single wall and double gypsum-board from Knauf.



SLOVENIA

Domen Ivanšek Technical Customer Support Representative in Slovenia, DGNB registered professional

ALL THE DOCUMENTS CUSTOMERS NEED

Knauf Insulation has a good Environmental Product Declaration database, easily downloadable GBRS documents and technically advanced systems. Having green building expertise helps me comprehensively explain the technical advantages of our solutions.

FIRST DGNB BUILDING IN SLOVENIA

Our new Knauf Insulation Training Center building should be one of the first DGNB certified buildings in Slovenia and feature a range of our products including our Green Roof Solution Urbanscape®. Work was scheduled to start in 2017 and finish in 2018.



Visit our website to see how our solutions contribute to points. Simply click on the 'Sustainable Buildings and Green Building Rating Systems' section of knaufinsulation.com

UNITED KINGDOM

Iain Macmillan, Knauf Insulation's Technical Development Manager in the UK, ex-passive house certifier and designer, who previously worked for the Building Research Establishment

BUILDABILITY AND FABRIC-FIRST APPROACH

A lot of my work is based around buildability and takes a fabric-first approach. In the UK, when it comes to buildings we have a big problem of building design compared to the reality of performance.

My work is not just about understanding the building but also how we can achieve performance that has been promised. For example, Knauf Insulation in the UK is carrying out a number of large scale projects to examine areas such as how we can control issues of installation to ensure energy efficient performance; the improvement of building health and comfort levels or better understanding the impact of occupant behaviour.

By researching data such as this we can provide the evidence base to campaign for government support for better buildings.



ROMANIA

Radu Mosteanu, Knauf Insulation's Technical Representative in Romania, trained in BREEAM

INCENTIVES FOR GREEN BUILDINGS

The number of certified green buildings has grown from just two in 2009 to 200 in 2014 in Romania, so there is a lot of interest. There is also a lot of competition between companies, if one wants to achieve LEED Gold, for example, another will aim to get Platinum. Additionally there are city hall incentives for green building through tax deductions.

EPD TRAINING

I take part in a lot of trainings and it is good to develop connections with assessors and other stakeholders as well as share information about, for example, our Environmental Product Declarations (EPDs) which gives us an advantage.

NEW LIDL HEADQUARTERS

Skanska is building a 12,500 m² headquarters for LIDL which is scheduled to be certified BREEAM Excellent. Knauf Insulation provided Rock Mineral Wool boards which use more than 50% recycled content from our nearby Nova Bana plant, Slovakia, in line with the green system's criteria. The product was used in the ventilated façade system and offers exceptional thermal, acoustic and fire protection performance.



"At Skanska we care about the sustainability of our projects and are continuing our endeavours to build green cities by maintaining a high level of investment in development projects and environment-based activities. In this respect, Skanska paired up with Knauf Insulation in Romania, a company that shares the same values and environmental vision. Knauf Insulation met all the requirements for eco-friendly materials and took clear responsibility for what they sold, providing us with declarations that guaranteed 50% recycled materials in the composition of their Rock Mineral Wool boards."

Richard Burleigh, President Skanska Construction, Romania

PHOTO © HÉCTOR SANTOS-DÍEZ

SPAIN

Josep Bové, GBRS expert in Knauf Insulation's Technical and Sustainability department in Spain and Portugal

GROWING TREND FOR GREEN RESIDENTIAL BUILDINGS

In Spain we have seen a large increase in the number of LEED buildings to about 540 registered and around 180 certified while there are 301 buildings certified with BREEAM. It tends to be companies that invest in certification for big office buildings or major retail projects but during the last half year we have seen a big increase by residential developers like Neinor or Avintia. We have also seen growth in the number of residential buildings aiming to achieve Passivhaus or NZEB standards. In fact, some regions are adopting Passivhaus criteria as a requirement for new buildings as interest in the environmental and economic benefits of green buildings grows.

OUR GREEN BUILDING EXPERTISE OFFERS UNIQUE INSIGHT

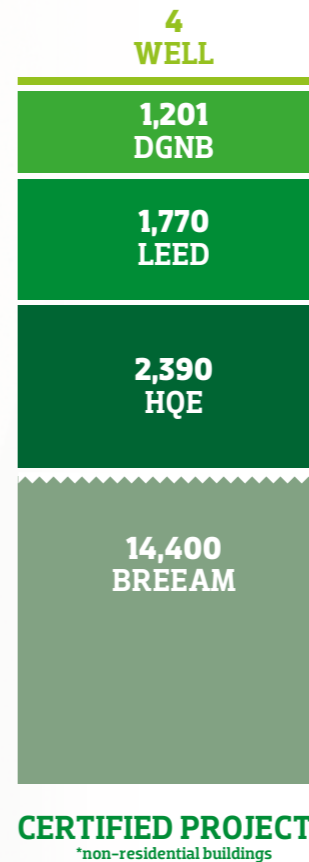
My post-degree studies have focused deeply on GBRS. Now as an active stakeholder I can advise specifiers and other professionals in how to maximise the opportunities that are being offered by these rating systems. Even better, my expertise allows greater insight into how Knauf Insulation contributes to the creation of better buildings.

TALLEST PASSIVHAUS IN THE WORLD

At the moment we are collaborating on three great projects in Spain. The first aims to be certified LEED Gold and will have the country's biggest green roof and feature 6,800 m² of our Urbanscape® Green Roof Solution. The second is the tallest Passivhaus building in the world — the 88-metre Bolueta Tower in Bilbao — and Soto de Lezkairu, the first Passivhaus multi-family building in Spain. Both these projects feature our internal partition insulation with ultracoustic that meets the highest air quality standards.



THE RISE OF GREEN BUILDING RATING SYSTEMS IN EUROPE



SERBIA

Edin Dalifi, Application Development Manager, Serbia, Macedonia, Albania and Kosovo, LEED expert

WE ARE HERE TO HELP

Sustainability is a very specific niche and the fact that specifiers — architects — can communicate with a material producer such as Knauf Insulation who understands green building needs, puts us in a small group of companies they want to work with.

FIRST BREEAM IKEA STORE IN SERBIA

The first IKEA store in Serbia will be certified with BREEAM. We received a request for the BREEAM factsheet for our products and specified Rock Mineral Wool (SmartRoof Thermal2) 24 cm for the flat roof (20,500 m²) and Decibel Glass Mineral Wool in partition walls.

'SUSTAINABLE CONSTRUCTION WILL BE THE NEW NORMAL'

Germany's DGNB Green Building Rating System's CEO Johannes Kreissig discusses independent certification, the importance of lifecycle assessment and why non-sustainable buildings will be price penalised.

TO WHAT EXTENT IS INTEREST IN DGNB GROWING IN GERMANY AND EXPANDING ACROSS EUROPE?

We are convinced that the DGNB system can make a positive contribution all over Europe. We have already partnered with Green Building Councils (GBCs) in Denmark, Switzerland and Austria to make the application easier by adaption to local boundary conditions. Further partnerships are on the way.

Since the application of the DGNB system enhances the sustainability performance of buildings, it is in the interest of DGNB to expand 'DGNB thinking' across Europe and globally.

WHY DO YOU BELIEVE GREEN BUILDING COUNCILS SUCH AS DGNB ARE INCREASINGLY IMPORTANT IN THE CONSTRUCTION INDUSTRY?

To achieve the vision of better buildings, instruments like certification are essential. In this context, the role of an independent third party is indispensable. GBCs are typically non-for-profit organisations with a high intrinsic motivation to improve the world.

HOW IS DGNB IMPROVING GREEN BUILDING STANDARDS?

Like the European Commission, DGNB is in favour of a holistic approach that considers, beside the environmental, economic and socio-cultural aspects, the complete lifecycle. DGNB is the first system compliant with EU macro indicators and therefore a blueprint for other systems.

But I think the term 'green building' is too narrow, we have to talk about sustainable buildings. Only buildings with benefits for people and society will be used long-term in a sustainable way. The DGNB system helps provide such a balance.

HOW ARE COMPANIES LIKE KNAUF INSULATION PROVIDING EXPERTISE THAT IS USEFUL IN THE EVOLUTION OF GBRs?

Energy efficiency is a basic requirement for sustainable buildings and expertise about products is indispensable. With its Environmental Product Declaration strategy, Knauf insulation supports an integral design and planning process in an excellent way.

TO WHAT EXTENT DO YOU SEE INSULATION AS A WAY TO ACHIEVE POINTS WITH DGNB?

To achieve points I think it will be in relation to the performance of the entire building rather than in the context of single products. But there are requirements on products regarding release and substances of concern. Knauf Insulation products should be compliant to these criteria anyway.

WHAT DO YOU HOPE THE WORLD OF GREEN BUILDING WILL LOOK LIKE IN 20 YEARS?

In 20 years, sustainable construction will be the new-normal with non-sustainable buildings seen as 'poor quality' reflected by a markdown in market price. The importance of certification as proof of high-quality – verified by an independent third party – will remain unchanged and the finance industry will provide green mortgages related to certification. Today, first market segments understand the business case behind sustainable buildings, in 20 years it will be mainstream.

'CAN OWNERS AFFORD NOT TO CERTIFY?'

Kay Killmann, President of the German Green Building Association GGBA and Managing Director of GBCI Europe (Green Business Certification, Inc), discusses the popularity of Green Building Rating Systems (GBRS) across Europe.

WHAT IS THE GERMAN GREEN BUILDING ASSOCIATION AND GREEN BUSINESS CERTIFICATION, INC?

GGBA is the official partner of the USGBC for Germany, Austria and Switzerland. It advocates the LEED benchmark and represents German speaking nations at the LEED International Roundtable. At GBCI all green projects and professional credentials are certified within LEED and other green systems such as SITES, Parksmart, WELL, EDGE, TRUE and ICP.

TO WHAT EXTENT IS INTEREST IN GBRs GROWING IN EUROPE?

Green building is no longer seen as the 'treehugger' thing it was 15 years ago. Today it is part of CSR/ESG strategies and investors' risk management. The tables have turned and if still in doubt, owners have to ask themselves, "Can we actually afford not to certify?" This is reflected in certification trends. For example, in 2002, Gold LEED accounted for under 30% of certifications. Today Gold accounts for over 50%. Interest continues to grow. Currently there are more than 5,269 LEED registered and certified projects in Europe, comprising more than 147 million gross square metres of space. A total of 164 countries and territories around the world have LEED projects and in Germany alone there are 704.

HOW IS THE IMPLEMENTATION OF LEEDV4 PROGRESSING?

It can be very challenging for some clients because it is very performance based. The market has to shift and manufacturers have to adapt. For example, if you don't address materials and lifecycle – through Environmental Production Declarations (EPD) – it will be very challenging to achieve platinum certification.

TO WHAT EXTENT ARE COMPANIES LIKE KNAUF INSULATION PROVIDING EXPERTISE THAT IS USEFUL TO GBRs?

LEEDv4 sets new standards especially within the Material & Resource category. This section in version four was structured around a lifecycle thinking approach and we have shifted from a single to multiple attribute evaluation. This is pushing us towards performance because it considers products and materials holistically. We need manufacturers to provide us with their specialist market feedback and reveal the gaps. They also have expertise that can be shared as systems evolve.

TO WHAT EXTENT DO YOU SEE INSULATION AS A WAY TO ACHIEVE POINTS IN LEED?

It contributes significantly to the overall envelope and to reducing energy consumption within the Energy & Atmosphere category. As already described there are credits that address lifecycle and EPDs which include data for recycled content, indoor air quality and so on. Insulation is common sense.

GREENING EUROPE'S BUILDINGS



CITIES, HEALTH AND WELL-BEING

Our innovative solutions contribute to air quality, reduce urban heat island effect, help tackle climate change and make cities greener.

GREEN CITY CHALLENGE

Air pollutants — known as particle matter — could be cut by up to 9% and sulphur dioxide reduced by as much as 6.3% in Europe's cities if building insulation installation rates were to be increased. Building insulation can also reduce the use of energy used in domestic heating and cooling and as a consequence the related outdoor air pollution. The result? Significant public health benefits and reduced related societal costs.

The findings, included in research by the European Insulation Manufacturers Association (Eurima) were based on a model that mapped an annual retrofit rate of 2% across 25 countries from 2005 to 2020 — compared to a business-as-usual scenario.

As urban planners draw up strategies for greener cities it is vital that improved rates of insulation installation are considered as well as the increased use of green roofs such as our Urbanscape® Solution to absorb air pollutants.

Air pollution is a major problem with a staggering 80% of people who live in urban areas being exposed to air quality levels that exceed limits set by the World Health Organisation (WHO). Air pollutants can increase the risk of heart attacks, lung cancer and chronic respiratory diseases.

Other problems facing cities include growing numbers of residents — 54% of the world's population now live in urban areas — which in turn means a rise in CO₂ emissions and the creation of Urban Heat Islands (UHI).

UHI is defined as a rise in temperature in any man-made area compared to rural surroundings. It not only has a negative 'over-heating' impact on residents but has also been linked to climate change through its contribution to the greenhouse effect.

THE URBANSCAPE SOLUTION

Green Roof Systems such as our Urbanscape Solution can dramatically change the temperature of a building — and reduce the number of Urban Heat Islands by converting old 'radiator roofs' into cool green areas.

Furthermore, they can absorb CO₂ and airborne particles. The bigger the plants and the bigger a city's green roof network — the bigger the level of urban particle absorption.

According to research carried out by Arizona State University and the head of Green Roof for Healthy Cities Steven Peck with Monica Kuhn, green roofs can remove 0.2 kg of particle matter per square metre of vegetated roof every year.

Scale this up a hundred times and the weight of the pollution removed would be the equivalent of the particles emitted by 15 typical passenger cars driven for a year. Now imagine the impact of the 1.45 million square metres of green roofs in Shanghai or the 500 buildings in Singapore that have been greened as part of the city Skyrise Greenery Incentive Scheme.

It is vital that action is taken to tackle air pollution because its impact on health is increasingly dominating headlines around the world. In 2017, the European Union revealed that Europe's air quality laws were being flouted in more than 130 cities across 23 EU countries.

SUBSIDY BOOST FOR URBANSCAPE

Customers who install our Urbanscape Green Roof Solution in the Czech Republic can cut costs in half thanks to a government subsidy.

Builders of all new-build passive level multi- and single-family homes as well as single-family houses that are undergoing deep renovation could already claim subsidies from the programme Nova Zelena Usporám — a scheme unique to the Central and Eastern European region — which attracted 8,000 applications and distributed €70 million in government funds in 2016.

Following campaigning by Chance for Buildings supported by Knauf Insulation, the government introduced a new subsidy add-on to the programme designed to increase the number of green roofs across the country to tackle CO₂ levels and air pollution as well as improve urban storm water management and reduce urban heat island effect.

Urbanscape meets all the quality criteria required for the subsidy.



HOSPITAL UNVEILS 20,000 m² URBANSCAPE ROOF

More than 20,000 m² of Urbanscape Green Roof System Air Solution has been installed on Sweden's Karolinska University Hospital. The facility, close to Stockholm, is one of the biggest hospitals in Europe with 15,880 employees, 1,600 beds and over 4,400 visits by patients every day.

The Green Roof was a joint collaboration between Knauf Insulation's Green Solution central team in Slovenia, Swedish Urbanscape partner Sempergreen/Eurotema AB and installer LW Sverige AB. The Green Roof System was specially designed for the Scandinavian market to ensure advanced storm-water control and energy efficiency performance.

SEVEN WAYS INSULATION IMPROVES HEALTH AND COMFORT IN HOMES

Insulation is a great way to save energy and help tackle climate change, but it also makes a major contribution to indoor health. Here's how:

1



Noise pollution

In Europe noise pollution has been linked to 43,000 annual hospital admissions, 900,000 hypertension cases and 10,000 causes of premature death. Mineral and Wood Wool insulation fibres absorb noise and provide a powerful sound barrier.

2



Cold comfort

When a building is well-insulated the indoor environment is immediately improved. This means no more unpleasant cold wall surfaces. Twice as many Europeans report poor health when they cannot keep their homes warm in winter.

3



Living better

Insulation keeps buildings pleasantly cool in summer and comfortably warm in winter. It creates comfort zones that allow everyone to flourish in a healthy environment. One in six Europeans report living in an unhealthy building.

4



Community care

For vulnerable sections of society – such as the elderly or very young – having a well-insulated comfortable home means better health and lower stress levels. Excess winter deaths among the elderly have been linked to cold housing.

5



Poverty trap

Nineteen percent of Europeans live in homes that are not comfortably cool in summer. Eleven percent live in homes not comfortably hot in winter – that's 50 million Europeans who face a choice between heating or eating on a cold day. Insulation is the solution.

6



Healthier air

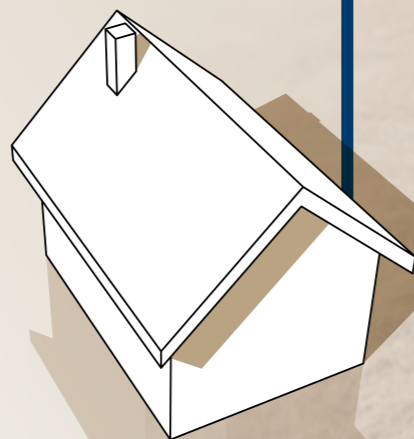
Insulation can reduce concentrations of external air pollutants by up to 9%. In Europe that means saving 78,678 life years every year and avoiding 7,173 annual cases of bronchitis. People are 40% more likely to have asthma when living in a damp or mouldy home.

7



Healthy savings

One study found that the annual healthcare cost of Europeans living in 'unimproved' housing was €194 billion. And, in the case of asthma and chronic pulmonary disease, the total cost for Europe was €40 billion.



WHAT DO EXPERTS SAY?

“Well insulated, comfortable homes have a major impact on the health and wellbeing of the population. At the most basic level, the prevention of nearly 25,000 excess winter deaths through the improved performance of homes in the UK has been highlighted as a priority area by the National Institute for Health and Care Excellence in the UK.”

Professor Will Swan,
Professor of Building Energy Performance,
University of Salford
in the UK

“Emissions from products are called Volatile Organic Compounds or VOC. Synthetic VOC can pose a serious health risk, especially to children. Eurofins Indoor Air Comfort Gold certification guarantees that a product has low emissions. Knauf Insulation was the first company to have its Mineral Wool with ECOSE Technology certified Indoor Air Comfort Gold.”

Thomas Neuhaus,
Head of Certification
Body Eurofins

HOME COMFORTS

There are two forces of nature that will sabotage the real performance of any building. Our Homeseal LDS System is the ideal solution to address these challenges.

Even small gaps and cracks in the building envelope can allow air to circulate and pass through or over insulation. This can significantly reduce the insulation's energy-saving potential.

Further complications can occur if humidity is allowed to migrate through or around the insulation. This can in some cases even lead to condensation and mould.

That is why the building envelope should be air-tight and should be protected from any risk of water damage.

In other words, it is critical to consider those two aspects in the insulation of your roof if you want to guarantee its efficiency.

An airtight building envelope not only safeguards the performance of insulation, but also contributes to internal comfort by locking out cold air caused by leaks.

Furthermore, by preventing uncontrolled condensation and possible mould spores, mildew or microbial organic compounds, an airtight envelope can contribute to the health of a building – particularly if combined with efficient installation of the solutions and a controlled ventilation system.

Our Homeseal Solutions

At Knauf Insulation we have created the Homeseal LDS range of insulation accessories that are designed to tackle the challenges of airtightness and humidity.

Our weather-proof Homeseal LDS breather membranes are installed above rafters to protect insulation from wind and rain while our Vapour control Homeseal LDS membranes are installed inside the building envelope to plug air gaps and protect the insulation against humidity coming from the inside of the building.

We have also selected products for the Homeseal range that are ideal for every application from purpose-designed gaskets and elastic sealants to a range of powerful and reliable tapes that have been designed to last.



HOMESEAL SYSTEM



Plugging gaps in air-tightness regulation

In the past when it came to building energy efficiency it was seen as sufficient to just install insulation. It is not.

In recent years, our knowledge of building physics has grown enormously and we understand that controlling air-tightness and humidity is critical to protecting building envelope performance in a long-term perspective.

And we are not alone. Many national regulations are also becoming increasingly demanding when it comes to issues of air-tightness and humidity. This regulation may vary from country to country, but we can help.

For example, in France, RT2012 enforces performance-related air-tightness as part of French regulation designed to reduce energy use in new buildings.

Our RT Plus System is highly popular in France and offers a built-in air-tightness and vapour control functionality and complements our Homeseal LDS Solutions. It has consistently proved to be ideal for installers keen to save time while ensuring the real performance of the building envelope. The RT Plus System meets construction and regulatory demands while ensuring comfort. In 2017 the system won the Engineering Prize in Toulouse and received a Trade trophy in July.

SOUND SOLUTIONS

TO IMPROVE ACOUSTIC HEALTH

We are dedicated to improving the acoustic health of buildings through pioneering solutions and exciting new research.

Aircraft landing, construction work, impatient traffic jams or simply noisy neighbours, loud colleagues or a barking pet-exposure to excessive levels of noise can be painful.

It also impacts health. The World Health Organisation (WHO) says uncontrolled noise can disturb sleep, cause cardiovascular and psychophysiological effects, reduce performance, provoke 'annoyance responses' and changes in social behaviour.

“In Europe one in five people are regularly exposed to sound levels at night that could significantly damage health,”

says WHO.

Research commissioned by the European Environmental Agency found that noise pollution causes 10,000 cases of premature death in Europe and more than 43,000 hospital admissions every year.

The challenge is that we spend 90% of our time in buildings and noise will always find a way in. And this is bad news for the human ear because it is particularly sensitive. For example, a sound that increases by 10 decibels (dB) would be perceived as twice as loud as the original sound – just compare a normal conversation, which is about 60 dB, to being next to a vacuum cleaner at 70 dB.

Now imagine the impact of a 10 dB noise increase on those living in multi-home buildings, working in partitioned office spaces, or children in schools...

The solution is reliable acoustic insulation. Acoustic insulation is relevant not only in partitions but also in pitched roofs to protect homes from noise or rain impact noise and in ceilings and walls to absorb noise and avoid reverberation effect. There are Mineral Wool or Heraklith Solutions for all these applications.

“Customers are understandably demanding better living comfort standards in buildings and we are seeing stricter national regulations particularly in public buildings such as schools.”

“As a result, the average level of sound insulation has been increasingly steadily over the years.”

Dominik Herfurth, Head of Research Area Drywall Systems & Application Testing, at Knauf Group, specialist Acoustic Laboratory in Germany.

PHOTO © BY TRIMO GROUP, SLOVENIA



Here is how Knauf Insulation improves acoustic health:

SPECIALIST SUPPORT

We have acoustics specialists to help our customers understand good acoustic performance and how our solutions can help. Our Mineral Wool and Wood Wool materials absorb sound and slow the flow of noise. Combine these elements in a variety of thicknesses and distances from the noise – ensuring correct treatment of potentially sound transferring elements such as studs and no reverberating surfaces – and exceptional acoustic performance can be achieved.

ABSORBING IDEAS

We have numerous acoustic insulation solutions that can be combined or customised to ensure effective noise management. For example, Mineral Plus has a tight fibre structure that offers exceptional acoustic performance and it can be easily cut to fit any gaps that may allow noise transfer; our Heraklith Wood Wool offers ideal acoustic solutions for garages or ceilings as a result of its uneven sound absorbing surface and our Urbanscape® Green Roof Solution offers excellent climate-friendly insulation as well as outstanding acoustic performance.

CUSTOMISED CARE

Our Original Equipment Manufacturing division (OEM) is world-renown for its production of tailor-made acoustic solutions. Recent projects include installing 2,500 doors featuring our DRS Supreme Board at the Kempinski Muscat Hotel in Oman and Bulgari Hotel in Dubai as well as 100mm PBE Board sound insulation cores for 15,000m² of sandwich panels for IKEA in Qatar. We have also used our Sound Supreme Board System to reduce noise at one of our busiest production lines in our Škofja Loka production plant and reduced sound levels dramatically along Munich's 2.8 km traffic tunnel that runs beneath Luise-Kiesselbach-Platz and Heckenstallerstrasse.

SOUND POINTS

All our key insulation solutions, such as Urbanscape, Mineral Plus and other Mineral Wool solutions, contribute points for acoustic performance in Green Building Rating Systems such as LEED, BREEAM and DGNB.

PIONEERING RESEARCH

Our Iphofen laboratory in Germany has been researching new ways to tackle noise pollution and improve the acoustic health of buildings since the 1970s. See page 31 for the full story.

SOUND INVESTMENT

There is nothing a building developer likes more than optimising the costs of a construction project – particularly if it results in a double bonus to the bottom-line.

Research by the Mineral Insulation Manufacturers Association (AVMI) in the Czech Republic recently compared the acoustic performance of lightweight partitions featuring Mineral Wool with partitions made from brick or aerated concrete.

The research – supported by Knauf Insulation – found that a 205 mm lightweight partition delivered an acoustic performance of 58 db compared to 395 mm concrete which delivered 54 db.

Equally striking was the space saving as a result of the thinner material. In a typical four-storey apartment building of 634m² this could add up to a total space saving of 27 m² or around 4%.

In a country where a square metre of apartment space can sell for up to 4,000 euros, the financial advantage of the lightweight partition is clearly highly attractive to developers.

The double bonus is that in addition to the profit potential of the extra space – the thinner material is considerably cheaper than brick or concrete partitions.



CASE STORY

ATLAS THEATRE, EMMEN, THE NETHERLANDS

THE PROJECT

The 15,000m² Atlas Theatre officially opened in 2016. It includes two theatres – one with 820 seats, the other with 300 – a café, two restaurants, seven conference rooms, offices, shop, two foyers and a grand foyer hall that has 20m high ceilings. The building also acts as the entrance to Emmen's new zoo.

THE CLIENTS

Gemeente Emmen, Van den Berg Group, Dura Vermeer.

THE CHALLENGE

The developers aimed to create what has been described as the greenest theatre in the country with perfect acoustics. The building had a lot of areas and corridors with parallel smooth walls. Without any acoustic modification the natural resonance would have been major nuisance.

THE SOLUTION

To avoid the high foyer becoming a sound box, Tektalan panels were installed on the outer walls of the stage halls. To further improve acoustic performance, Tektalan A2 and Heraklith A2 were also installed in the technical room, at the stage room entrance, along the corridors behind the dressing rooms and in the basement with the orchestra pit. As a further benefit, the panels have white, grey and black decorative finishes which were designed to match the theatre's interior design perfectly.

WHAT WAS SUPPLIED

Knauf Insulation provided a total of 648 m² of Heraklith A2 and 6,851 m² of Tektalan A2. Tektalan is a multilayer board with alternating lap-joints made of a top Wood Wool layer and a Rock Mineral Wool core to better absorb sound as well as to offer exceptional fire performance. The products were chosen on the recommendation of contractor Dura Vermeer.

Head of theatre technology Koos Maris said: *"It was vital that the new theatre had state-of-the-art light and sound. At Atlas Theatre the challenge was to keep the natural resonance time of the big halls as short as possible to ensure each activity sounded as it was meant to sound. The final result is a beautiful building with perfect acoustics."*

SOUNDS OF SUCCESS

Finding innovative new ways to improve the acoustic performance of buildings has been the focus of our Iphofen laboratory for more than 30 years.

At Knauf Insulation and throughout the Knauf Group tackling noise pollution is a major focus.

A dedicated laboratory in our Global Headquarters in Iphofen, Germany, has been offering acoustic testing facilities since the 1970s and is continuously upgraded to unique world-class levels with the latest technology. In 2017 a new testing room was added.

Now the facility includes three direct transmission test rooms for partitions, two for ceilings, two flanking transmission test rooms for partitions and ceilings, a reverberation chamber, critical frequency test room and an enviable range of equipment.

And acoustics is just a small part of what we do. At the laboratory we work with a wide range of regional research and development teams and test laboratories from across the globe to study all aspects of product and solution performance from fire resistance to load capacities to resistance to earthquakes.

Here are 10 reasons why our laboratory with its physicist, audiologist and technician – along with three skilled installers – is making a difference for customers.



1 ENJOY THE DRAMA, NOT THE ACTION MOVIE

Our state-of-the-art technical capabilities allow exceptional levels of acoustic measurement and system testing that are rare in other laboratories. The team at our Iphofen laboratory has achieved remarkable results of cutting sound by 83 dB (the sound of a pneumatic drill measures 100 dB at 10 metres) for cinema partitions. This was achieved through 'hybrid' system solutions – combinations of different boards, types and thicknesses along with large cavity substructures and Mineral Wool – to achieve outstanding performance. These solutions will allow cinema audiences to enjoy their romantic comedy without being disturbed by the high-octane action movie next door.

2 SAVOUR THE SOUND OF SILENCE

Our ability to test a variety of different solutions and systems from across the entire product range of the Knauf Group and Knauf Insulation allows our laboratory to pick and choose as well as test and research a huge range of system solutions in a variety of combinations to achieve exactly what our customers need. Access to such a product range and such personalised expertise is a huge advantage for customers looking for highly specific acoustic solutions.

3 OUR EXPERTISE GROWS WITH EACH TEST

By keeping our research in-house we grow our expertise, maintain its confidentiality and develop a range of acoustic specialisations that is not lost to external testing laboratories. In other words, we keep control of the process. This allows the entire Knauf Group to benefit from this expertise as well as our customers and partners.

4 BIGGER IS BETTER

Unlike a lot of other laboratories, we can carry out large tests over a long period of time. If we are not happy with a result, we can adjust the setups and try again. And again. This gives us unparalleled flexibility as we do not have to rely on external laboratories for a range of ever-changing tests which would be unacceptably expensive.

5 BEYOND CERTIFICATION

Having our own laboratory allows us to control the quality of our products in-house. We can ensure they exceed regulation requirements before they are produced and make certain we control that quality, for instance, by constantly testing products until they fulfil requirements.

6 WE CAN SHARE OUR KNOWLEDGE

At the laboratory we can form our own strategic partnerships and benefit from the research. As our facilities are in-house we can customise testing to meet requirements from other industries. For example, we recently carried out work with a brick producer that was keen to examine the acoustic potential of its materials in combination with drywall systems. We were happy to help.

7 UNPARALLELED DEPTH OF RESEARCH

As research on a project develops we can adjust and customise test programmes to meet intermediate results or change according to new priorities. Plus, of course, we can draw on many years of laboratory research across the entire Knauf Group product range if we are looking for specific solutions.

8 A FULL 360 VISION

Creating high-performance systems is an important aspect of the laboratory's work, but combining them is a unique selling point. Developing partitions, facades, suspended ceilings and floors and then testing each element and in a variety of combinations to build up the big picture is a speciality of our researchers.

9 SMALL THINGS MAKE A BIG DIFFERENCE

Breaking down a system to its component parts to understand how they perform – from the boards and screws to the Mineral Wool – is vital to understanding how all the components in a system perform. We are working on that data daily and have a wide range of knowledge.

10 WE HELP CUSTOMERS AT EVERY LEVEL

Our laboratory specialists can help customers better install our systems and products to maximise performance and we also carry out trainings with the Knauf Academy. Additionally, we have a huge volume of technical test certificate documents that are popular with specifiers such as engineers and architects. After 40-plus years of working with customers we have a good idea of what they need and when.



School renovation that makes the grade

From fire safety and good acoustic performance to comfortable classrooms and great thermal comfort, we help specifiers get top marks for educational renovation projects.

Anyone attending a school or college deserves a safe and effective environment in which to learn. And from new build school projects to major renovation schemes, Knauf Insulation can provide solutions that are designed to improve the learning environment for everyone.

Sound measures

THE CHALLENGE Uncontrolled noise can easily disrupt teaching. Without insulation that offers reliable acoustic performance, heavy rain on a flat roof can make a classroom reverberate like a tin drum and music lessons next to a language class can ruin comprehension.

CASE IN POINT In the UK, the Department of Education's Building Bulletin 93 sets national standards for school noise levels, reverberation times and sound insulation because "poor acoustic design has a detrimental effect on pupils' academic performance". The standards define minimal noise levels for new build schools and schools under renovation and cover every educational aspect from primary school rooms, music areas and lecture halls to rooms for students with special needs, libraries, swimming pools and dining areas.

WAYS WE CAN HELP The excellent sound insulation and absorbing properties of our Mineral Wool solutions easily exceeds the standards set by Building Bulletin 93, while Knauf plasterboards, Heraklith Wood Wool and Urbanscape® Green Roof Solutions can all be customised to provide a huge variety of systems that meet any noise absorbing requirements.



Fire safety

THE CHALLENGE Fire safety is obviously a priority for any educational establishment.

CASE IN POINT Knauf Insulation has consistently supported national policy makers, fire safety associations and fire fighters in the creation of fire safe buildings. In 2016, we welcomed in Serbia a new regulation that prevents the installation of combustible material in facades in all new build or under renovation public buildings — particularly schools.

WAYS WE CAN HELP Many of our Mineral Wool solutions are non-combustible with the highest A1 reaction to fire as defined by the EN13501-1 European Standard.

Reliable performance

THE CHALLENGE In order to learn effectively it is vital that students are not cold in winter or hot in summer.

CASE IN POINT Any school in any climate needs to offer an environment in which students and teachers can thrive without distractions caused by extreme temperatures.

WAYS WE CAN HELP Our entire business is built on the creation of high-performing solutions that keep the interior temperature of buildings at comfortable levels. From Blowing Wool and Wood Wool to Mineral Wool and even Green Roof Systems, we have solutions that can be customised to any requirement.

Return on investment

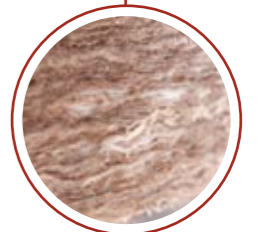
THE CHALLENGE All schools face budgetary pressures and school managers are always looking for ways in which to get a good return on investment.

CASE IN POINT Many countries are initiating renovation programmes rather than building new schools. For example, in Serbia a major renovation programme is underway to make schools more energy efficient.

WAYS WE CAN HELP Insulation saves energy. Saving energy saves money. Rather than pouring money into leaky school buildings, our solutions plug wasteful gaps and generate savings over a long-term future period.

"There are many types and methods of insulation... but as a guide, non-combustible insulation should be used... in respect of these materials Mineral fibre products are inherently non-combustible. They do not contribute to fire growth and will be acceptable for many applications. Mineral fibre products will need to be selected by proven fire performance for the particular application."

A Guide to the Design and Protection of School and Academy buildings by the Zurich Insurance Group.



Clean air

THE CHALLENGE Good air quality is vital to a healthy school environment.

CASE IN POINT Air quality in public buildings, particularly schools, is a major priority in many countries. For example, in the US, there is a specific Children & Schools Certification by Greenguard to establish air quality and emissions requirements.

WAYS WE CAN HELP Our Mineral Wool solutions with ECOSE Technology are certified by Eurofins Indoor Air Quality Gold label according to Volatile Organic Compounds Indoor Air Quality emissions criteria. These products also pass the criteria of Blau Engel in Germany, the Finnish M1 label while Knauf EcoBatt in North America is certified to Greenguard Children & Schools standards.

Knauf Insulation and the Knauf Group are also part of a new organisation that is committed to improving the interior building health of schools in France. The Consortium Qualité Environnement Intérieur aims to generate greater awareness of how indoor air quality, thermal, acoustic and visual comfort can all be upgraded in nurseries, kindergartens and elementary schools. Healthy minds learn more effectively in a healthy environment, says the group which includes the companies Aldes, Gerflor and Tollens. As of the first of January 2018, indoor air quality monitoring will also be mandatory in schools and nurseries in France.



RENOVATION

INNOVATIVE RENOVATION OF 190 HOMES BY EX-ARMY ENGINEERS IS A MAJOR REAL PERFORMANCE SUCCESS FOR KNAUF INSULATION.

FORCE

190 RENOVATIONS, ZERO COMPLAINTS

A pioneering Knauf Insulation project involving a unique approach to the renovation of 190 homes could pave the way for a vastly improved nation-wide energy efficiency strategy in the UK.

Already building renovation and energy efficiency schemes have cut energy use dramatically in the UK with a 30% drop in domestic gas consumption recorded between 2005 and 2015.

"Unfortunately, many homes did not necessarily receive the renovation they deserved," says Steven Heath, Knauf Insulation's Technical & Strategy Director (Northern Europe).

"The programme tended to incentivise measures — work on walls or lofts — rather than considering the best approach to individual homes while the 'stop-start' nature of the schemes meant many installers were often on the edge of financial viability."

In 2016 Knauf Insulation began to explore an innovative new approach to this renovation challenge.

The initiative was vital because a decade of research by Knauf Insulation had revealed important gaps in the energy performance of buildings. Issues such as air tightness and thermal bridges as well as a need for a sharper

focus on managing every detail of a renovation have been shown to be essential.

The project asked the question: can we create a team of highly motivated individuals and rapidly up-skill them on thermal renovation outside of the traditional supply chain?

The chosen route was to recruit ex-British Army servicemen from the Royal Engineer Corps — all with a construction background but not in energy efficient renovation.

The men were first given a classroom course on the theory and practical skills of high quality renovation with a focus on best practice and the consequences of bad workmanship.

The theory was then followed with practical training on all our Blowing Wool and Loft solutions at our St Helens training rigs and then in a live test house.

Once training was complete they started work on a month-long project in February 2017 to renovate 190 housing association homes in the city of Manchester.

"They delivered above and beyond expectations providing a consistently high level of performance. They also impressed visiting government officials who toured the site," says Steven.

The project has contributed significantly to Knauf Insulation's real performance campaigns.

"It may take a few years, but sometime soon building codes and renovation programmes will transition away from a 'one size fits all' software estimate of building efficiency and instead rely on technology to offer a better, more building specific, picture of home performance," says Steven.

The next steps for us are to drive forward our real performance agenda while also campaigning for the Government to revisit the way it evaluates and incentivises energy efficiency in both new build and renovated buildings. Thanks to our project in the UK, that work has already begun.

NEW POLICY INSIGHT?

The 190-home renovation project generated major interest from UK policymakers. The initiative was visited by policy advisors from the Department for Business, Energy & Industrial Strategy as well as officials from the Government's Office of Gas and Electricity Markets (Ofgem).

The renovation project was vital because a decade of research by Knauf Insulation had revealed important gaps in the energy performance of buildings.

On a customer service level, the project received the highest praise of all — zero complaints from the hundreds of people living in the 190 renovated homes.

"It was evident early in the project that the installers were comfortable engaging with tenants and private homeowners alike," said Ian Booth of Bridgewater Surveyors, which oversaw the work. "Significantly, neither we nor the housing association have received a complaint to date."



BIM: THE BUILDING BLOCKS OF THE FUTURE

The future of the construction industry is already online, that is why Knauf Insulation is contributing to a new digital landscape reimagined by Building Information Modelling.

WHAT IS BIM?

Building Information Modelling (BIM) is a new exciting process that brings transparency, collaboration and efficiency to construction by combining 3D design, visualisation and data management. This data is important because it can be used to model a building's functionality as it is built, carry out energy simulations, access its impact on the environment and offer insight into areas such as thermal or acoustic performance.

WHO USES BIM?

Specifiers, engineers, architects and construction companies all use BIM to generate models that allow clients to create an overview of a building and make changes before work begins. Tackling issues at the design stage also helps avoid costly mistakes during construction. In the future BIM will allow everyone in a project team to work on all stages of a building's development to ensure it is kept on course. BIM information can also be used after a building has been completed to assess areas such as maintenance.

HOW IS KNAUF INSULATION HELPING SPECIFIERS TACKLE BIM CHALLENGES?

We have carried out BIM training across our company and created an expert team to help specifiers with any BIM requests. We also host feedback sessions with BIM users around the world to ensure our support meets any challenges.

HOW IS KNAUF INSULATION VISUALISING A BIM FUTURE?

Innovative solutions such as our Green Roof System Urbanscape®, Mineral Plus and SUPAFIL Blowing Wool are now available in the most common BIM formats on our country-specific websites. We have also published product and system BIM libraries from North America to Australia and are constantly reviewing our content to ensure it is useful and relevant. Sustainability also being important, we include environmental data in our BIM files.

WHY IS KNAUF INSULATION PIONEERING BIM SOLUTIONS?

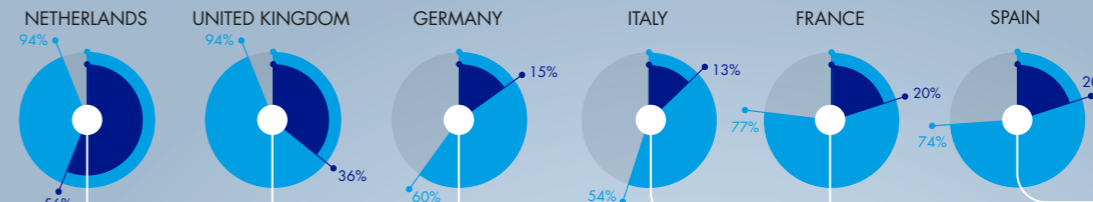
We believe BIM is the start of a digital revolution that will transform the construction industry and soon allow building data — such as R or U-values — to be managed and shared at the touch of a smartphone. Easy access to shared data is becoming increasingly important because building construction is now more complex, Green Building Rating Systems are demanding more digital information and real performance needs to be reliably audited.

HOW WILL BIM IMPACT GREEN BUILDING RATINGS SYSTEMS?

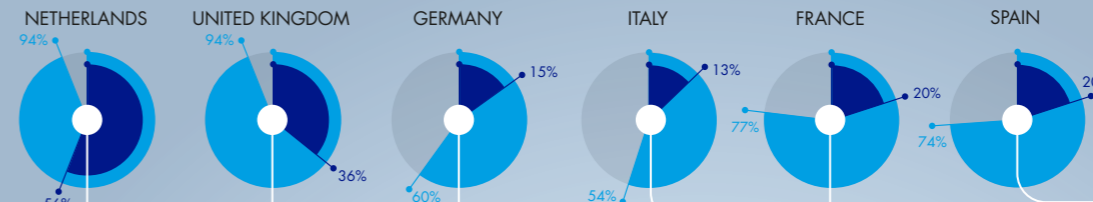
BIM could become influential in GBRS as it could be used to assess the entire sustainable performance of a building. It's not part of any GBRS criteria yet, but DGNB is working on how the "interlinking of BIM solutions and sustainability certification for buildings can work". Perhaps in a few years' time the data collected from Lifecycle Assessments and Environmental Product Declarations could be fed into BIM formats. How appealing would it be to know how to achieve your LEED or BREEAM rating simply by checking your phone?



2015 AWARENESS OF BIM

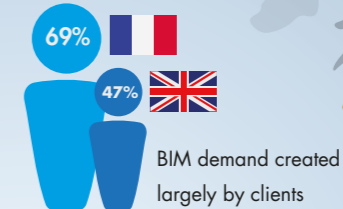


2015 USAGE OF BIM



IMPACTS OF BIM ON COMPLEX PROJECT OUTCOMES

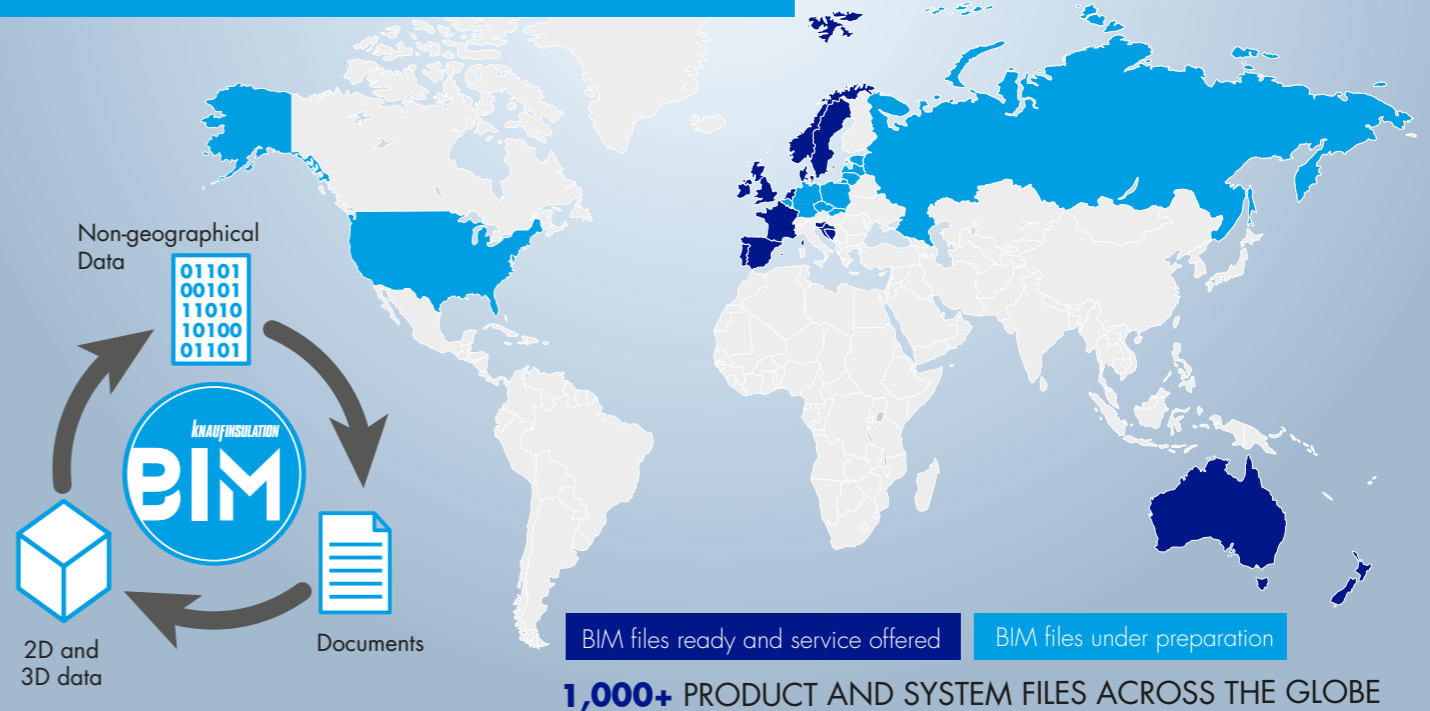
IMPROVED CONSTRUCTABILITY OF FINAL DESIGN	90%
INCREASED OWNERS UNDERSTANDING OF PROPOSED DESIGN SOLUTIONS	88%
IMPROVED QUALITY/FUNCTION OF FINAL DESIGN	88%
IMPROVED ABILITY TO PLAN CONSTRUCTION PHASING AND LOGISTICS	88%
REDUCED REWORKING	72%
REDUCED FINAL PROJECT COSTS	35%



French government wants x100,000 houses developed using BIM in 2017

*Source: Arch-Vision report, January 2016

KNAUF INSULATION GLOBAL BIM LIBRARY



EPD & LCA documents included according to



Formats available:





READY FOR THE PREFABRICATION REVOLUTION?

SUPAFIL® MAX FRAME OFFERS A FAST, EFFICIENT, LABOUR-SAVING INSULATION SOLUTION FOR TIMBER FRAME MANUFACTURERS WHO WANT TO BOOST THEIR PREFABRICATION PROCESSES AND FUTURE-PROOF THEIR BUSINESS.

Prefabricated buildings are shaping the future of the construction industry and it's easy to see why. They can be constructed quickly, cheaply and without a huge amount of onsite labour. Quality building standards can be regulated in a controlled factory setting and manufacturing processes can be increasingly automated to speed up production.

And business is booming. According to a European Architectural Report survey, over 65% of architects in The Netherlands, UK, Spain and France say they expect demand for prefabrication buildings to increase in the next three years.

But what does this mean for manufacturers who are at the cutting edge of prefabrication? It means they are upgrading their processes to dramatically increase capacity and speed up throughput. They are investigating ways to save costs, reduce labour, remove manufacturing bottlenecks and find every possible way to make the entire process as efficient as possible.

At Knauf Insulation, we have created the future-proof solution that can be customised to meet all these challenges and more — our SUPAFIL® MAX Frame.

So, why is it so special?

Manufacturers need a fast and easy system to install insulation into prefabricated frames that boosts capacity and speeds up factory throughput.

Our Blowing Wool SUPAFIL MAX Frame can be effortlessly integrated into any production process and is modular which means it can be combined with existing machinery if necessary. The labour-saving system is perfect for timber frames and can be used for prefabricated walls, roofs and floors. Depending on the level of system automation required, up to 1,200 kg of insulation can be injection-installed every hour. As you only need 35 kg/m³ to achieve a lambda of 0.034 W/mK, this means up to 34 m³ of insulated frames every hour.

Manufacturers need insulation that boosts factory efficiency.

Fuss-free SUPAFIL MAX Frame Blowing Wool installs cleanly, is non-abrasive and is easy to handle. Our massive 174 kg compressed packing bales minimise refill times, maximise truck loads and storage area usage and are a giant step forward in terms of time, space and manufacturing efficiency. More importantly, compared to many other insulation products, SUPAFIL MAX Frame distributes smoothly, quickly and evenly into even the most complicated frame space without unnecessary waste.

Additionally, although SUPAFIL MAX Frame is high-performing, it is light which adds no significant extra weight to prefabricated frames.

Manufacturers need a high-performance insulation solution that really delivers.

As SUPAFIL MAX Frame does not settle and fills frame cavities completely there are no thermal bridges just exceptional thermal performance (0.034 W/mK at 35 kg/m³ in closed cavities) as well as good acoustic performance. Target density levels and the quality of density distribution are easily confirmed via a control panel.

Manufacturers and their customers demand an insulation solution that is environmentally responsible and non-combustible.

SUPAFIL MAX Frame has Blue Angel certification and is certified to Eurofins Gold Standard for Indoor Air Quality. Up to 80% of the wool is made from recycled glass, SUPAFIL MAX Frame is non-hazardous and it is low on dust — which is important in factory environments. SUPAFIL MAX Frame's reaction to fire is A1 incombustible according to EN13501-1 standards and the material is hydrophobic which means it does not absorb moisture.

FASTER, CHEAPER BUILDINGS

How big is the demand for prefabricated buildings?

Fifty-five percent of architects in The Netherlands already see prefab elements being used in buildings; 41% of Spanish architects say they are already using prefab followed by 38% in Belgium and 35% both in Germany and the UK. In France, the percentage is 18%, Poland, 26% and Italy 24%. These figures are according to a survey of architects by the European Architectural Report.

What form does prefabrication take?

There are two types: those that consist of single products such as preassembled insulated door frames (2D prefab) or prefabricated modular buildings which are preassembled units (3D).

How is this impacting on the future of the business chain?

Rather than a contractor relying on numerous suppliers and subcontractors, a role will be allocated to a manufacturing 'system' partner who will have responsibility for the entire building ensuring all their suppliers and subcontractors work to established standards.

MINERAL WOOL ADVANTAGE

Our Mineral Wool with ECOSE Technology continues to be a long-standing success with many of our customers who manufacture timber frame prefabricated buildings.

And no wonder. Our Mineral Wool offers exceptional thermal and acoustic performance as well as an A1 reaction to fire. There is no added formaldehyde, artificial dyes or acrylics and our Glass Mineral Wool is made from up to 80% recycled glass. It was also awarded the first Indoor Air Comfort Gold certificate by Eurofins.

"Every building we produce is customised to requirements depending on the architectural project. We chose Knauf Insulation Mineral Wool for its outstanding mechanical properties. The workers installing the Mineral Wool appreciate that it doesn't crumble at the edges or break and that the packages are lighter. The workers also like the fact that the insulation contains no added formaldehyde and that there is a wide range of products in different formats from wool in rolls to slabs."

Antanas Norvaišas, Director of JSC Liskandas which produces timber frame houses for Scandinavia and Lithuania

Škofja Loka

Powering innovation

Our Škofja Loka plant in Slovenia has been at the cutting edge of technology since it started operations in 1959.

Our Škofja Loka plant in Slovenia has always enjoyed a reputation for innovation since it became the first plant in the country to manufacture Rock Mineral Wool almost 60 years ago.

Today, as our biggest manufacturing based in Eastern Europe, that tradition continues thanks to the plant's highly respected research and development laboratories, cutting-edge customised solution division, original equipment manufacturing (OEM) section and, of course, the Green Solutions Unit which is in charge of our revolutionary Green Roof Solution Urbanscape®.

"The reputation of Škofja Loka has always been driven by ongoing development, innovation, team work, testing and the constant search for new solutions. We have consistently challenged ourselves to look for new ways of creating better performing solutions for our customers and fresh ways of offering something better to the market."

Tomaž Lanišek, our General Manager OEM Europe & CIS

Customer inspiration

We have a lot of scientists and a lot of sophisticated equipment at our state-of-the-art laboratory at Škofja Loka in Slovenia — but the biggest source of innovation and inspiration comes from our customers.

The domestic appliance laboratory of our Original Equipment Manufacturing (OEM) division started operations in 2010 and now carries out around 200 tests every year for appliance companies — such as oven manufacturers.

Due to more demanding energy standards, these manufacturers are increasingly turning to our laboratory specialists for fresh insight and advice into ways to make their products more energy efficient.

"Over the years we have developed so many different solutions and principles that we now play an advisory role for our customers and this has given us a very important competitive edge," says Uroš Cotelj, Business Development Director of Domestic Appliances.

"How our customers drive innovation was recently demonstrated by our relationship with Electrolux Italy. They required a new insulation solution for a range of ovens. In June 2016 they had approved our solution that has been designed to improve energy efficiency of the oven platform and three months later we were asked to supply 600,000 pieces a year. In October that year we won an innovation reward from Electrolux."

The key to the laboratory's success over such a short period, says Uroš is understanding the real needs of final customers and driving new research that is mutually beneficial to both Knauf Insulation and manufacturers.

Enhancing performance

At the Central Product & Systems Development Laboratory the focus is on testing and evaluating the performance of a variety of insulation systems. This starts with benchmarking of existing products, moves on to the improvement of existing systems and goes further to the development of new products and systems (e.g. new roof insulation or fire protection systems). As well as the development of new applications we are also focusing on plant support by analysing products and various unknown material, which could accrue in the industrial production process.

Our Central Product & Systems Development Laboratory is also in close contact with all local quality departments in the plants, as one additional key aspect is the verification, optimisation and the development of new quality procedures and measurement methods to meet internal and international standards.

With all our dedication and passion we try to fulfill our customers' needs as close as possible.



How a fresh start-up mentality energised Urbanscape

Starting a successful small business today is easier than ever and can simply require a great idea, endless enthusiasm and a convincing online presence.

So, what would happen if the youthful energy of a start-up were channelled into Knauf Insulation — a company that was founded in 1932?

This was the question asked by Saša Bavec, Knauf Insulation's Group Marketing Director and Managing Director of OEM, who decided to create a separate 'start-up concept' to drive sales, marketing and business development for our Urbanscape portfolio.

"One of the Knauf values is entrepreneurship and start-up companies epitomise this," he says. *"They are usually small which means they can move quickly, learn from mistakes fast and have the energy to find creative solutions to traditional challenges. I wanted to see what would happen if this start-up energy were applied to Knauf Insulation."*

Following a call for online digital specialists, three graduates — Katja Berčič, Andreja Molan and Žiga Pregelj from Ljubljana University — expert in agronomy, horticulture and landscaping architecture — were selected for the new online mini-business unit based at Škofja Loka, Slovenia, in February 2017. For all three it was their first real job.

The unit was given as much freedom as possible to develop new ideas for the business' digital channels and kept 'at a distance' from the rest of the company. A mentor (in the form of Barbara Šubic) offered day-to-day guidance and a focus for regular brain-storming.

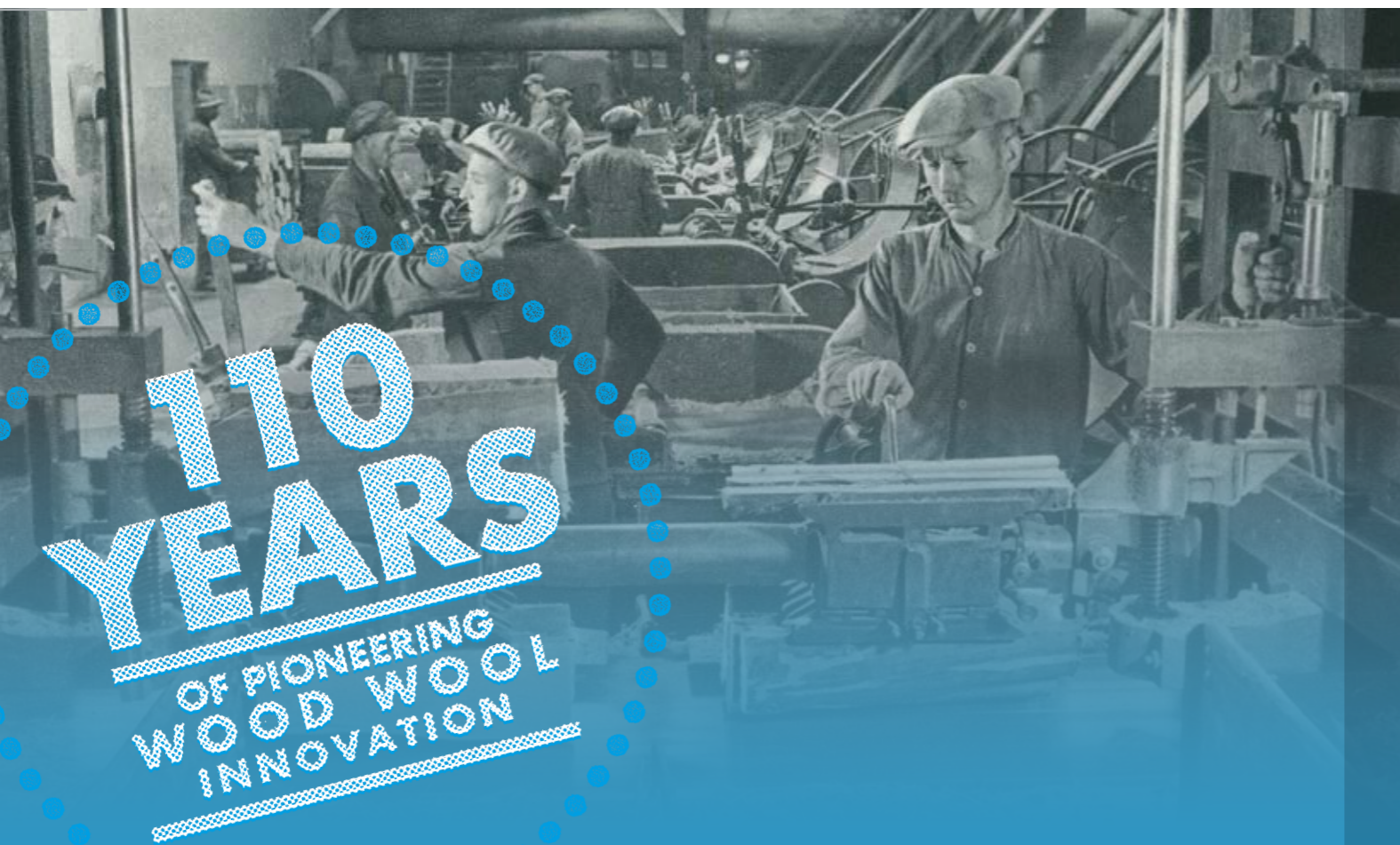
So, what have been the results? It is early days, but the unit has already underlined that unlike traditional sales and delivery methods for many of our products, multi-level digital channels are vital to customers looking for Urbanscape Solutions.

Within three months the graduates had set up an online store for Slovenia, created social network communication channels and developed the software tools that customers need.

As a result, sales have increased by 300% year on year and plans are now in the pipeline to roll out an international online Urbanscape store as well as country-specific channels.

"From initial contact online to discussing requirements to the packaging of a product for customers, the new unit can handle everything from small scale orders for gardeners to major building projects for developers anywhere in the world," says Saša.





Lightweight, easy to install and offering exceptional thermal and acoustic performance, our legendary Heraklith Wood Wool boards continue to transform the construction industry – 110 years after they were first patented. Much of that achievement is down to our Simbach plant in Germany which in 2017 celebrated 90 years of pioneering innovation.

When engineer Robert Scherer filed a patent for his new fire-proof, lightweight, porous material in 1908 he had no idea that his invention would transform the building industry.

The patenting of this revolutionary new material not only created a completely new market for Wood Wool but also paved the way for a legacy of pioneering innovation that continues to impress 110 years later.

Today Heraklith is the brand customers turn to when they need a versatile, durable and lightweight Wood Wool product with exceptional thermal and acoustic performance, impeccable sustainability credentials and outstanding fire safety.

Ensuring that this easy-to-install product remains at the forefront of Wood Wool innovation is our Simbach plant in Germany which celebrated its 90th anniversary in 2017.

Our colleagues in Simbach have been building on Heraklith's historic legacy backed by generations of customer-focused experience to find new ways to improve Heraklith products and manufacturing processes. The aim has always been to enable clients to meet their increasingly complex challenges whether at a theme park in the Middle East or in a new football stadium in Hungary.

However, it is vital that we push the boundaries of the market we created by constantly meeting customers' needs and exploring the potential of Wood Wool in every possible building scenario. Whether in offices, commercial sites, residential homes or public buildings, Heraklith is an endless journey of innovation.

For instance, we recently introduced a new range of accessories that make it easier than ever to install Heraklith quickly and efficiently as a 'whole solution'. Our list of test performance certification also continues to grow increasingly comprehensive. We have launched a versatile colour range that maintains its colourful good looks even if chipped or dented. We have also developed special plates for room acoustics, multi-layer products for enhanced heat insulation and dozens of new Heraklith applications are being researched.

Unsurprisingly, with such a future focus, we're looking forward to celebrating another 110 years of Heraklith innovation.

HOW SIMBACH MADE HISTORY

Millions of square metres of Heraklith boards are installed every year – and that is a testimony to the industrial innovation of our Simbach plant that has been producing the boards for 90 years.

The first buildings to use these boards for walls and ceilings were constructed in 1914 and the application became such a success that the manufacturers outgrew their original factory at Ferndorf in Austria. When a new state-of-the-art facility was opened at Simbach, Germany, in 1927, it was a triumph.

Thanks to Heraklith, building times were slashed because it was easy and fast to install; wall thicknesses could be reduced; its insulation and fire-proof properties were universally praised and it provided a highly durable plaster substrate – attributes that still resonate with customers today.

Heraklith proved so popular that by 1939 annual production had risen tenfold to 10 million square metres.

It was a success story that would continue to grow throughout the 20th century. Europe underwent a significant construction boom in the years following the war and by the 1960s Heraklith was selling 17 million square metres in Germany alone.

A decade later came expansion into north-west Europe, a growing export market to the Americas followed by the newly emerging markets of Eastern Europe which inspired the creation of a new base at Zalaegerszeg, Hungary, in 1989. A plant at Oosterhout in The Netherlands also came on line to cope with demand.

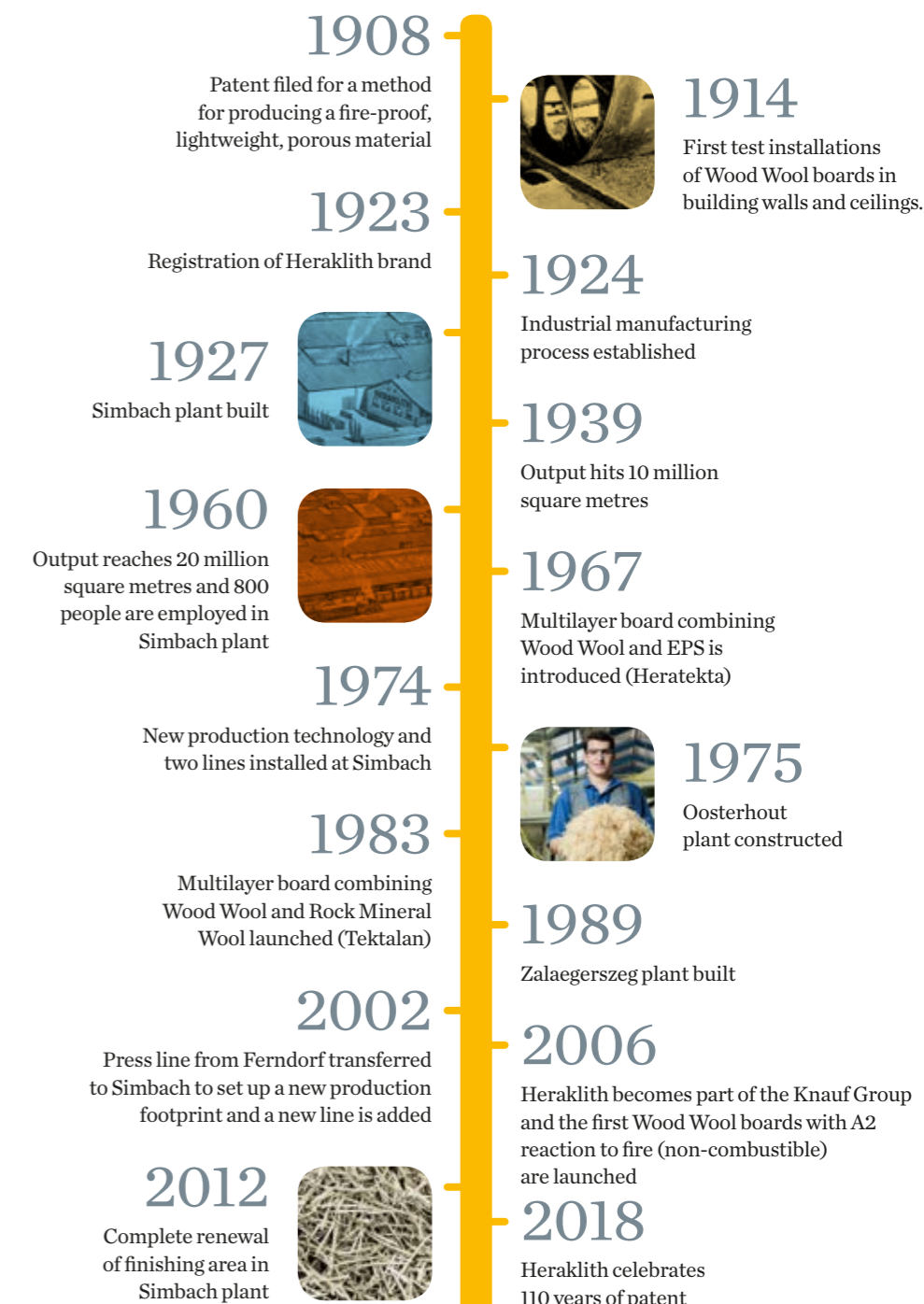
At the heart of such global success our Simbach plant continues to drive innovation, new products and pioneering manufacturing processes.

Wood Wool by Heraklith

Improving wood since 1908

Today Heraklith's influence continues to grow. The brand is becoming increasingly well known in the Middle East, particularly in Dubai and Qatar, thanks to our new dedicated team in the region. Meanwhile, in Nordic countries, Heraklith is boosting its presence through Knauf A/S in Denmark.

In 2017 at Simbach, work started on building a new state-of-the-art administrative centre and, at Oosterhout, the plant has launched the Heraklith Experience Centre. The centre is designed to showcase the potential of our products to project stakeholders and show opportunities to installers and new employees new ways to install Heraklith quickly and effectively.



Naturally inspired

At Heraklith we are committed to pushing the boundaries of sustainability at every level.

RESPONSIBLE SOURCING

We use wood certified by the Forest Stewardship Council (FSC) which is an internationally renowned labelling scheme recognised by the LEEDv4 Green Building Rating System. We also use wood that has been responsibly cultivated and harvested in line with the European Programme for the Endorsement of Forest Stewardship (PEFC). At Simbach we process 10,000m³ of spruce wood every year.

ENVIRONMENTAL PRODUCT DECLARATIONS

Environmental Product Declarations (EPDs) are available for all our Heraklith products showing their environmental impact based on independently produced Life Cycle Assessments (LCAs). Through this process, every environmental aspect of our products' lives is covered from the sourcing of raw materials, manufacture, transportation and use to ultimate disposal. Our commitment to sustainability is underlined by Blue Angel certification, the world's oldest eco-label.

NOISE ABSORBERS

Heraklith products can contribute considerably to the reduction of noise pollution. They are used extensively in car park and basement ceilings, technical rooms, farming facilities and public buildings. They have excellent acoustic properties, A2 non-combustibility and outstanding fire resistance as a single board or when combined with Mineral Wool.

REUSING RESOURCES

The wood from Simbach multi-layer boards that can no longer be used is removed and used internally — often as protective packaging for transportation. Insulation core elements such as EPS are either returned to the original supply companies for reuse or in the case of Rock Mineral Wool cores, removed and fed back into the production process at our Rock Mineral Wool plants.

WHAT'S IN A NAME?

A great deal for Heraklith. In many countries such as Germany or Austria it's almost the default word for Wood Wool. Heraklith comes from combining two words — Herakles (Hercules in German) and lithos (Greek for stone). During his 12 legendary tasks, Hercules built a giant wall from boulders to divert powerful rivers and clean the king's stables, so his name proved to be the ideal inspiration for architectural innovation and stone-strength reliability. Today, Heraklith's brand recognition is stronger than ever.

Heraklith

CASE STORY

FERENCVÁROS FOOTBALL CLUB (FTC), BUDAPEST, HUNGARY

"We were looking for a material that provides good sound absorption, is long-lasting and aesthetically pleasing for the FTC Stadium. Based on our past experience and good feelings about the product we chose Heraklith."

Burics Oktávian, designer for SAMO, architects of the stadium who worked with contractor Market Építő Zrt

Challenge: The club needed good sound absorption and an aesthetically pleasing solution for its conference areas, technical rooms, leisure spaces and garages. The garage insulation had to be capable of eliminating vehicle noise and offer excellent fire protection.

Solution: For garages a combination of Heraklith Wood Wool and Knauf Insulation Mineral Wool — now available from our plant in Zalaegerszeg as a single product known as Tektalan 037/2 — was the ideal solution offering certified non-combustibility, high fire resistance and the ability to withstand vehicle impact. For the conference areas and other rooms, Heraklith boards fitted easily into tight ceiling applications to offer exceptional acoustic performance and optimal product durability.



PHOTO © GGARITAN

WHY DO CUSTOMERS CHOOSE HERAKLITH?

FAST, EASY AND EFFECTIVE INSTALLATION

"If you require a product that can be quickly installed across large surface areas — such as car park, walls and ceilings or public buildings such as student housing — Heraklith really delivers. It is thin, lightweight and available in pre-finished surfaces, and this means a small team can insulate vast areas quickly and easily with minimal effort. We have used Heraklith in many developments, the latest being Stebru a transformation project next to Hollands Spoor rail station in The Hague for 303 student units and 153 starter homes — around 1,400 m² of commercial space and garage. Heraklith never fails."

Dick van Eck, Raab Karcher Waddinxveen, The Netherlands

OUTSTANDING FIRE RESISTANCE

"Heraklith offers excellent EN1365-2 A2 class fire resistance when combined with Knauf Insulation's Mineral Wool. It provides a protective fire shield that does not melt or produce burning droplets during a fire and that makes it ideal for projects such as car parks or public buildings."

Dipl.-Ing. Mario Lichy, BIENERGY Energy Management Company mbH, Germany

ALL-ROUND SOLUTION

"Tektalan boards provided an exact fit to obtain highly efficient acoustic performance. Also the fact that Tektalan panels provide thermal insulation and have an A2 fire classification made them the perfect all-round solution for our project."

Robert Frieden, Kaefer Isoliertechnik, Austria

BUILDING RESPONSIBLE SUPPLY CHAIN EXCELLENCE

THE NEWLY PUBLISHED ISO 20400 STANDARD ON SUSTAINABLE PROCUREMENT OFFERS KNAUF INSULATION A UNIQUE OPPORTUNITY TO WORK TOWARDS SUPPLY CHAIN MANAGEMENT EXCELLENCE.



CENTRALISED PROCUREMENT

We are building a new Central Procurement structure to simplify processes and be an 'umbrella' for different markets. For example, we have implemented new standardised supplier qualification at the specification tendering phase. The suppliers have to meet specific criteria for quality, health, safety and the environment (QHSE). Once they are selected, regular audits are carried out.



CONTRACT CLARIFICATION

We are developing a new supplier contract process and code of conduct that clarifies what Knauf Insulation expects from suppliers and what they can expect from us. This ensures long-term sustainable relationships through clear agreements. We are also putting in place a master contract agreement for all suppliers and for all key materials.



ISO 14001 SUPPORT

We are supporting suppliers that need help to achieve ISO 14001 standards of sustainability and keep a database of suppliers that informs us if their ISO has expired. We want to develop good relationships with our suppliers and provide the best quality of materials from sustainable sources. ISO 14001 certification is now becoming a supplier pre-requisite for extracted raw materials that we input into our batch. It also contributes to points in BREEAM certification.



CULLET IMPROVEMENT

Our Glass Mineral Wool is made up of 80% recycled glass – mainly used bottle and window glass. But we want to improve the quality and ease of access to recycled glass used across the company. That is why we are exploring new initiatives such as the development of a new facility next to our St Helens plant in the UK which will provide a constant supply of recycled 'furnace ready cullet'. The cullet – made from high quality recycled glass – can be easily used by the plant reducing waste to landfill while saving raw materials and energy.



SECONDARY MATERIALS IN ROCK MINERAL WOOL

At our Rock Mineral Wool plants we are also aiming to increase the amount of secondary materials that are fed back into our manufacturing process. For example, at our Nova Bana plant in Slovakia, a quarter of the used raw materials is constituted of recycled steel slag. New sources of slag are investigated for all plants. Another example is our Skofja Loka (Slovenia) plant which reincorporates up to 7% of Rock Mineral Wool trim coming back from customers' manufacturing sites. Rock Mineral Wool off-cuts from our Simbach Heraklith plant in Germany are also valorised as secondary material at our St Egidien plant in Germany.



INTERNATIONAL REGULATION

Our contract section works closely with our regulatory and sustainability department to ensure every element of every solution has been independently audited to guarantee its compliance with relevant regulations. These include, for example, REACH which covers the safe use of chemicals in the European Union; CLP regulation which rules on classification, labelling and packaging and RoHS which covers the restriction of hazardous substances for electrical and electronic equipments. The CE logo on our products shows they are in compliance with the Construction Products Regulation (CPR) which lays down specific rules for the marketing of products such as ensuring they are in line with sustainable natural resource use.



TIMBER SUPPLIES

Materials for our Heraklith Wood Wool are sourced from PEFC (Programme for the Endorsement of Forest Certification) or Forest Stewardship Council (FSC) woods. Those schemes ensure forests are responsibly managed in respect to issues such as environmental impact, community relations, workers' rights, conservation and indigenous peoples' rights. FSC is an independent international scheme recognised by LEEDv4.



ESSENTIAL ROLE OF LCA

We examine the environmental impact of our products using Life Cycle Assessments (LCA). This provides us with unique insight and allows us to identify any potential elements or processes that could have a particularly negative environmental impact. For example, this could mean the use of a raw material that is very scarce or offers a regulatory risk. We call this process hot spots detection. Information from our suppliers with impact data also helps us improve our LCA results.



LOCAL SOLUTIONS

Reducing transportation distances is another way we aim to decrease the environmental impact of our supply chain. For example, at our Tyumen plant in Russia, we sourced local supplies of sand – just 30km away from the plant – which reduced transport distances. We also increased our storage capacity with a new area of 1,320 m² to reduce the number of deliveries. In Northern Europe, our sites in St Helens, Cwmbran and Queensferry recently achieved BES 6001 standard for their responsible sourcing practices.

What does this mean for Knauf Insulation?

It means we want to ensure raw materials are extracted in a responsible manner, respecting neighbourhood communities in the process.

We want to see this process carried out by workers who have fair salaries and we want strong anti-pollution and waste management measures in place to protect the environment in every respect.

We want to guarantee fair and transparent business with our suppliers and we want to ensure that our customers receive high performing, high quality solutions that respect the most demanding consumer regulation.

So, how are we doing?

It's a process of continuous improvement. Here are our key developments:

A CIRCULAR ECONOMY SUCCESS STORY

What? A new wall system known as ECO-SANDWICH has been developed by Zagreb's Faculty of Civil Engineering and Faculty of Architecture in Croatia.

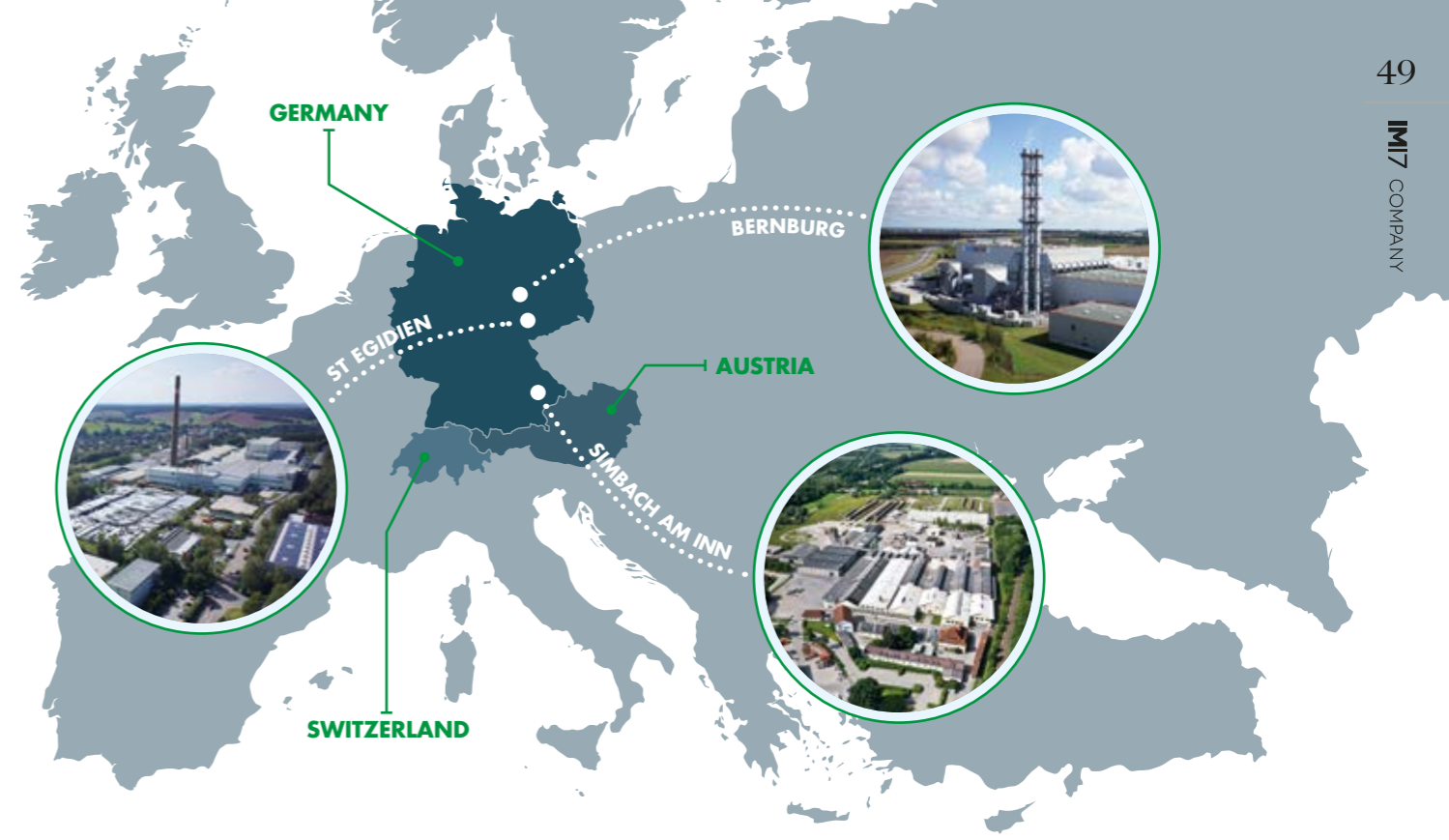
How? The pre-fabricated wall panel uses recycled construction and demolition waste as well as Knauf Insulation's Mineral Wool with ECOSE Technology which is composed of up to 80% recycled glass. Our responsible supply chain plays a key role by ensuring the high quality level of the recycled content.

Where? The first of 12 passive-energy standard multi-family social homes featuring the new material has been built in the Croatian city of Koprivnica.

EMPOWERING CUSTOMERS



At Knauf Insulation's Central European Headquarters in Simbach, Germany, Regional Managing Director Michael Huesmann discusses the transformation from a production-led company to one led by customers.



WHAT ARE THE KEY AREAS OF FOCUS FOR KNAUF INSULATION AND THE KNAUF GROUP IN GERMANY AND CENTRAL EUROPE?

On a wider societal level, we want to play a pivotal role in bringing the 2050 German Climate Action Plan to life. This is an ambitious national framework that includes the reduction of CO₂ emissions in buildings by 80% by 2050.

From a business perspective, we want to be the preferred partner of branded insulation solutions. We want to anticipate the needs of our customers and excite them with innovative products and services.

HOW WILL THIS BE ACHIEVED?

By putting the customer at the centre of everything we do. We are employing highly talented people and we are constantly questioning the status quo from the top to the bottom in every department and finding new opportunities to do things better. It may sound straightforward, but even by ensuring the basics are right you set a competitive advantage because the basics are sometimes quite difficult in this industry.

WHY IS THE GERMAN MARKET SO IMPORTANT TO KNAUF INSULATION AND THE KNAUF GROUP?

It's our largest market in Europe in terms of population and the amount of buildings. The country's insulation requirements are also particularly demanding. Compared to other national markets, for example, our average lambda building value is 035. The good news is that a demanding market fosters innovation and that helps us drive forward improved solutions.

THE 2050 CLIMATE ACTION PLAN MUST BE A SIGNIFICANT DRIVER IN GERMANY AS WELL.

Of course. In Germany, our renovation rate is below 1% per year at the moment. Deep renovation is the key to achieve Germany's targets and needs further political support as well as funding. The whole industry is behind this action plan because it is helping drive the economy.

WHAT HAS BEEN KNAUF INSULATION'S IMPACT ON THE GERMAN MARKET?

Since starting operations in 2002 we have grown quickly to become a formidable competitor. In addition to our rapid organic growth, the acquisition of Climowool in 2013 and Heraklith took the company to a whole different level to provide a complete portfolio of Rock Mineral Wool, Glass Mineral Wool and Wood Wool insulation products. The acquisition of our Bernburg plant strengthened our position by ensuring a self-sufficient local capacity.

INNOVATION HAS PLAYED A KEY ROLE TOO?

Absolutely. In 2009 when our bio-based ECOSE Technology was launched it was a huge step forward and made our Glass Mineral Wool much more competitive. Constant product innovation in every segment – especially in flat roofs and ETICS – has helped position our products and systems as premium solutions. The market takes us very seriously now.

THROUGHOUT THE EVOLUTION OF KNAUF INSULATION THE KNAUF NAME MUST HAVE BEEN A SIGNIFICANT MARKET BONUS?

The Knauf Group has a lot of positive connotations in Germany and Central Europe because it has always been associated with the trade and in particular quality trade – since it was founded in 1932. It also has a lot of credibility because the strategy has always been to build strong loyal relationships with the industry. The financial strength of the company also drives constant investment which has been a huge success factor over the years.

AND ADDING THE INSULATION PORTFOLIO EXPANDED THE KNAUF GROUP PRODUCT RANGE SIGNIFICANTLY.

Yes. And there is a lot of synergy between the group and Knauf Insulation. We are working to produce more system solutions using the entire Knauf portfolio to tackle the challenges facing our customers.

CAN YOU GIVE EXAMPLES?

We are working across different technologies. For instance, Heraklith is a Wood Wool that can be available with a different core such as rock and for pitched roofs and we have insulation systems that include LDS foils to improve airtightness and moisture control. We have a unique advantage because we leverage our market position by working across the huge range of technologies available from the entire group. It's an important key to success.

HOW ARE THESE SOLUTIONS MATCHED TO CUSTOMER NEEDS?

In several ways. For instance, the needs of a dealer are different to those of an architect so we have segmented our teams to provide tailor-made technical expertise to specific customer segments and taken out layers to speed up decision making. We also segment our expertise by application – we have a Blowing Wool team, an Urbanscape® Green Roof team, flat-roof team and so on – to provide customised support. If you build an industrial flat-roof it's completely different to building a single home, so we adapt to specific markets. We talk to people to understand how we can improve things for them and we have a vast portfolio so we can look at different applications to see how to make their jobs easier.

WHAT OTHER NEW CUSTOMER INITIATIVES ARE IN THE PIPELINE?

Our Fachunternehmer Club, for example, offers trades people extra loyalty club benefits and information, so we are building on its success. We are also working with a collaboration of different manufacturers to create digital information platforms for consultants, homeowners or tradespeople so they can find the best solution for them. We are also looking at different ways to support Building Information Modelling (BIM) platforms.

TO WHAT EXTENT IS SUSTAINABILITY IMPORTANT TO KNAUF INSULATION?

It will always be critically important. Externally we want to contribute significantly to a more energy-efficient building stock and drive the agenda of energy efficiency in our industry and beyond. We are also in the process of creating new environmentally responsible products and systems that will revolutionise the industry in the future and we are constantly working to ensure that all our solutions deliver on their promise of energy efficiency at every level.

AND INTERNALLY?

We want to ensure continuous improvement of our energy efficient production processes, expand the Knauf leadership principals to have the best in class performance of our organisation, build on the success of our health and safety environment and continue to expand environmentally responsible initiatives such as our recycling programmes.

KNAUF INSULATION CENTRAL EUROPE IN FIGURES

2002
OPERATIONS STARTED

3
TECHNOLOGIES
ROCK MINERAL WOOL
GLASS MINERAL WOOL
WOOD WOOL

3
PLANTS
SIMBACH AM INN
BERNBURG
ST EGIDIEN

3
MARKETS
GERMANY
AUSTRIA
SWITZERLAND

800
EMPLOYEES (APPROX.)

EXCELLENCE GUARANTEED

Understanding the needs of our customers is central to the sustainability of our business.

Customer care is a journey of continuous improvement. We are constantly upgrading our expertise through internal and external training to ensure we speak the language of specifiers and installers fluently.

The needs of the construction industry are becoming increasingly sophisticated and it is vital that we understand what information our customers require when it comes to sustainability issues such as Life Cycle Assessments (LCAs), Environmental Product Declarations (EPDs) and Building Information Modelling (BIM).

Customers are also increasingly demanding technical input on subjects such as building physics which covers key topics such as acoustics or fire resistance and a better understanding of technical performance.

Thirdly, understanding how our systems and products can make life easier and more effective for our customers is a core characteristic of many of our training sessions. It is not enough to simply understand a product's unique benefit, it is vital that our customers understand how to maximise its performance.

Finally, it is critical that our colleagues understand the challenges facing our customers and are empowered to find the solutions that provide long-term support.

Here's what we have learned so far from our Customer Excellence Programme.



TELYUKOV DENIS,
NATIONAL RETAIL & DIY LEADER,
SAINT PETERSBURG, RUSSIA

What training sessions did you organise?

We have carried out a wide range of training for sales teams in Russia to improve their knowledge of our products and how to substantiate their performance. There has also been a seminar on pitched roofs as well as external training to fine-tune sales presentation.

What are the benefits of this training for our customers?

They receive expert advice about the right insulation products for the right job – 24 hours a day, seven days a week – supported by a specialist who understands the demands of their business.

How has the training made a difference?

For our colleagues, the training has been an important KPI accomplishment and we have been able to confirm their core competences. For our customers there has been a greater level of satisfaction.



SUSANNA FARNES,
MARKETING MANAGER FOR
THE MEDITERRANEAN AREA

What training sessions did you organise?

We organised training in Spain for the Spanish and Italian technical and specifier teams with a focus on the importance of sustainability as a critical trend and key benefit of our solutions.

What are the benefits of this training for our customers?

Our teams have a vastly improved insight into Green Building Rating System topics that are important to our customers and are able to provide more effective solutions and support.

How has this training made a difference?

Our sales teams are even more confident. They can offer more support to our customers and talk in detail about subjects such as EPDs, LCAs and specific green building areas of interest which means they have a lot to offer specifiers and architects.



STIJN THIELEN, MARKETING
MANAGER, THE NETHERLANDS

What training sessions did you organise?

We have conducted talk-track training for our new innovative Mineral Wool MW35 solution. Talk-track allows our colleagues to understand the benefits of our innovations and enable them to present them effectively to potential customers.

What are the benefits of this training for our customers?

What is most important is that our colleagues can better support customers because they can clarify needs and advise customers on the right solution during a relaxed but informed conversation.

How has the training made a difference?

MW35 is a great success in The Netherlands. I'm sure training was a major contributing factor.



STEVE DUKE, COMMERCIAL
DIRECTOR, UNITED KINGDOM

What training sessions did you organise?

The UK sales teams have undergone customer engagement training which is delivered in two stages, two months apart, to enable our colleagues to use their new skills and review them at the second session.

What are the benefits of this training for our customers?

The course focuses on helping us better understand our customers' needs. It also helps focus attention on areas that have value for them such as technical support, specification activity, product attributes, supply chain, security and so on. Often we tend to take these aspects for granted when they should be highlighted as often as possible.

How has the training made a difference?

The training process has just started but those who have attended have come away inspired and determined to start driving a shift in the way we engage with our customers.



MARKUS ELSPERGER,
MARKETING DIRECTOR
FOR KNAUF INSULATION,
CENTRAL EUROPE

What training sessions did you organise?

We carried out training for the whole sales team in Germany in 2016 and training will take place in Austria in 2017. At every meeting our focus is on technical sections which also includes technical training for the sales team. Four times a year we give new employees general product training.

What are the benefits of this training for our customers?

We carried out a customer satisfaction survey in December 2016 and our customers confirmed that we have the most knowledgeable technical support in the market.

How has the training made a difference?

We see the training paying dividends particularly at construction sites where customers may have a specific technical issue that they need to resolve.



JEAN-PIERRE PIGEOLET,
PRODUCTS & BUILDINGS
SUSTAINABILITY MANAGER

What training sessions did you organise?

In Germany, we arranged trainings in ETICS and for flat roofs. In Italy and Spain, 'train the trainer' involved giving training to those who can share the information with colleagues as well as training customised to dedicated markets. For example, we compared EPDs and their impact related to specific markets and applications. They were highly dynamic sessions.

What are the benefits of this training for our customers?

It really helps our colleagues understand their market and take advantage of our product and service's benefits in terms of sustainability. These include ECOSE Technology, EPD availability, LEED, DGNB and BREEAM factsheets and recycled content. With training and additional tools our colleagues are better equipped to have face-to-face discussions with potential customers who need information about, for instance, indoor air quality or LCA. Our teams know where to get that information.

How has the training made a difference?

In Italy and Spain, for example, we have experts who can have detailed conversations with customers about sustainability issues at product and building level. They have also had deep conversations with LEED assessors who have come back and requested product information for specific construction projects. The questions coming from trained people are now detailed and focus on particularities we didn't even think about – proof that they are becoming experts and know where to take advantage of sustainability to get better buildings.

CUSTOMER EXCELLENCE IN NUMBERS



OUR JOURNEY TO SERVICE EXCELLENCE

Service Excellence was introduced several years ago after a forensic examination of every aspect of service within our company from the placing of orders to delivery to our customers.

It was vital that customers were central to this process so we began implementing continuous improvement at every stage.

We rolled out the programme gradually, piloting new ideas, bringing all our teams up to speed and stress testing every aspect to ensure our promises were watertight.

Customer service

For our customer service centres, extensive training and new online systems created instant clarity in terms of service delivery lead times, order processing and support. All clearly communicated.

Production planning

Our plant processes have been streamlined to ensure best possible safety stock levels as well as a sharper focus on achieving the best possible availability for highly popular product mixes.

Warehouse and transportation

Warehousing processes have been revised and the booking systems of our transportation networks and partners as well as their performance are always under review. Extra services such as unloading at site or the organisation of cranes or forklifts are tailored to customer needs.

Country catalogues

In many countries we also publish catalogues to clarify exactly what our customers can expect from Knauf Insulation. These include information about lead times, prices, available services and transparent details about what can be expected from order to delivery.

CASE STORY

Martin Siegwart, is the purchaser for insulation boards for Sto in Germany. Sto SE is the country's leading provider of external wall insulation systems.

Why is delivery important to Sto's success?

Delivery reliability is a critical because quality and timely delivery is vital to our clients. Most deliveries have to be made direct to their building sites so it essential to deliver on time and with quality.

How has Knauf Insulation's Service Excellence helped contribute to the success of these projects?

A high volume of orders was placed with Knauf Insulation and Knauf in 2016 and 2017 and the delivery performance has been exceptional, consistent and reliable. The internal sales teams and Knauf managers were always friendly and available to help. Even when there were critical situations they were able to find high quality solutions. We have also managed several huge building sites for our customers with Knauf.

FIVE KEY BENEFITS OF SERVICE EXCELLENCE FOR OUR CUSTOMERS

- 1 Our service to customers is flexible.
- 2 Every department in Knauf Insulation contributes to service and this guarantees we continuously give the best possible support to our customers — promises we can keep.
- 3 Consistent lead times mean reliable planning options for customers and ourselves, make us more efficient and increase product availability in our stocks.
- 4 Time slots are offered for job site deliveries to allow smooth planning. Mobile Order Management is an ongoing project to allow us to improve our delivery service and provide real time communication with our customers regarding the arrival time of their shipments.
- 5 Extra services such as small loads, specialised products, the collection of packaging or site support in the form of forklifts or cranes are standard available service options.

QUALITY LEADERS

At Knauf Insulation we are pioneering new definitions of Quality Excellence. The focus? The needs of our customers.

The Oxford English Dictionary definition of the word 'quality' is straightforward: "The standard of something as measured against other things of a similar kind; the degree of excellence of something."

At Knauf Insulation this definition is not enough.

One of the core values of our brand is a drive for Quality Excellence that ensures our products go far beyond being either 'measured' or just 'excellent'.

What is Quality Excellence? Very simply, it's understanding what our customers perceive as quality and then delivering. This means identifying their needs and then improving our product specifications, testing procedures, auditing progress and establishing new quality benchmarks. It is not just about looking at the technical specification of a product, but also examining the way it is used to achieve the best possible performance.

"In the construction industry, quality can be measured by meeting regulations or achieving specific standards that are universally recognised and understood," says Mark Thompson, Knauf Insulation's Head of Market & Product Development – Non Residential.

"Of course, our products meet these standards but we need to take them to a higher level by talking to the people who use them, understanding their challenges, adapting our products to the market and giving our customers the quality that they really need."

We have spent time with customers on construction sites to watch, learn and ultimately understand how our products are installed and used. This has led to external and internal audits followed by new quality controls and manufacturing benchmark recommendations to ensure our customers get the quality they need.

Ultimately, this has led to a laser-sharp focus on real performance — in the real world — at every stage of product development.

"You may have a product that was good 10 years ago and was used in a specific way," says Mark. "But the world of construction changes, buildings change, ways of doing things change. At the heart of our Quality Excellence programmes is the need to track these changes and make sure that customer requirements are constantly factored into everything that what we do."

CASE STORIES

RAFTER FRICTION FIT INSULATION

The challenge: In Germany friction-fit insulation is highly popular for installation between roof rafters. However, not all rafters are equal, distances between them in modern buildings are increasing.

The solution: We visited many sites across Germany to establish the modern realities of this market and updated our testing procedures and products to meet these new requirements.

MINERAL PLUS

The challenge: Installers in Turkey required high standards when it came to the real thermal and acoustic performance. They also needed an insulation solution that saved time during installation. We carried out extensive research to understand exactly the challenges they faced.

The solution: We developed Mineral Plus to offer the ideal balance of a level of stiffness that makes it simple to cut and an ease of flexibility that ensures it fits easily into the most demanding spaces. It does not break or chip during installation and offers excellent friction fit. A slab of Mineral Plus is also half the weight of our Rock Mineral Wool and this makes it easy to move around a site in fewer trips.



- PEOPLE
- LEADERSHIP
- IMPROVEMENT SYSTEMS
- VISION & GOAL ALIGNMENT
- WORKPLACE STANDARDS

Continuous improvement, or CI, is a philosophy which looks to engage and empower front line employees to continuously improve business processes. Health and safety (HSE) is embedded in a CI culture.

Disorganised, inconsistent, hectic and exhausting. These were just some of the words that our colleagues used to describe working conditions in our plants at St Helens, Cwmbran and Shelbyville in the days before Continuous Improvement.

Productivity, morale and most importantly health and safety performance were all in need of improvement. For Ian Gornall, Knauf Insulation's Industrial Performance Director GMW Europe & CIS, empowering front line employees was a logical step. "Managers are only around for 30% of the time, so it is obvious to devolve expertise to the people running the processes 24/7," he says.

This was the starting point for the CI journey which started in St Helens in 2011 and fits perfectly with Knauf Insulation's values of commitment, entrepreneurship, partnership and menschlichkeit.

So, how does it work? First, through workshops, and by asking the people at the sharp end of production (operators and engineers) to create standards for their workplace, their processes and the maintenance of their equipment. Creation of standards which all of the teams buy into provides a strong foundation for future improvement and results in more reliable performance (so less fire-fighting) and increased understanding and partnership between production and engineering teams. Critically, this is a process which is supported by but not led by managers.

"If we do a workshop and a number of actions come out of it – it's imperative that those actions are delivered on by the management team. This starts to form a kind of virtuous circle – operators keep their promise to maintain the standards and managers keep theirs. It's how you build trust," says Ian.

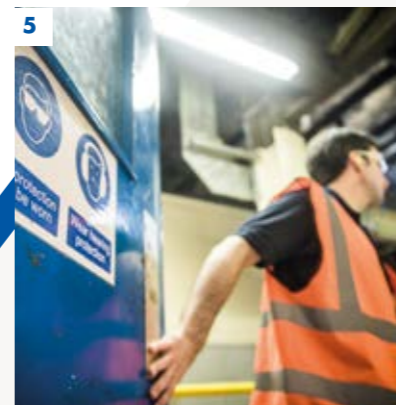
"Everyone is in this together and the improvements spread from one plant area to another as more standards are agreed. Operators become vested in CI because the solutions are their solutions. The work becomes easier and more rewarding. Operators and engineers take ownership, they become empowered and the culture starts to be 'simply the way we do things around here'."

This momentum is maintained by allowing operators and engineers to take part in the day-to-day management of their processes – the day-to-day issues, measuring their performance against targets which are aligned to business objectives, checking that their standards are being maintained and prioritising day-to-day tasks. They do this through daily meetings which are attended by area stakeholders. Support requirements are then escalated to the daily management meeting. Not only does this drive the engagement of operators and engineers, it frees managers up to focus on more strategic issues.

There is also a CI initiative that encourages all employees to submit ideas to improve their processes, equipment or work areas. Suggested improvements are reviewed on their merits and feedback is given for all ideas in a visual way so teams have access to all information. St Helens and Cwmbran plants receive in excess of 200 ideas every year, most of which are implemented.

The big question is how can you quantify the success of a change in working culture? At the end of the day there must be an improvement in the site's Measures of Performance which are usually efficiency, customer service, manufacturing cost and health and safety.

Continuous Improvement is now being implemented in all our plants in Europe and the USA. In Europe, St Helens and Cwmbran received 68 visitors over five separate reference visits between November 2016 and January 2017.



INDIVIDUAL AND TEAM AWARDS

The East European HSEEQ Leadership Award was presented to Natalija Domjanič, an HSEEQ Manager at Ajdovščina in Slovenia. A team award also went to Novi Marof in Croatia where employees achieved the most goals outlined in our annual HSEEQ KIEE & OEM improvement plan.

- PHOTOS
1. NOVI MAROF PLANT
 2. SHELBYVILLE PLANT
 3. SIMBACH PLANT
 4. KRUPKA PLANT
 5. ST HELENS PLANT
 6. ESKISEHIR PLANT

AT THE SHARP END OF HSE

"When it comes to health and safety, dozens of small actions can soon add up to making a big difference," says Bernd Göckert, Health and Safety Officer at our Simbach plant in Germany.

One of those 'small things' was as simple as replacing the use of box-cutter knives with special safety knives where the blade retracts automatically when not in use. "Suddenly, cutting packaging in the plant is a much safer occupation," says Bernd.

Such attention to detail has certainly paid off. As of August 30, 2017, the plant had marked 526 days without a lost time accident (LTA).

THE GOOD, THE BAD AND THE SAFE

There is a lot to learn from both good and bad observations when it comes to work safety, says Jamie Cain, our HSE Manager at Shelbyville.

"Good observations reinforce proper safety behaviour and negative observations are a good coaching tool," he says. Our STEP-UP programme – or Safety Takes Every Person's Unrelenting Participation – asks for colleagues to submit good or bad observations about the plant to engage everyone in conversations about safety at work.

"This helps keep safety on everyone's mind throughout the day."

BUILDING A BETTER CULTURE

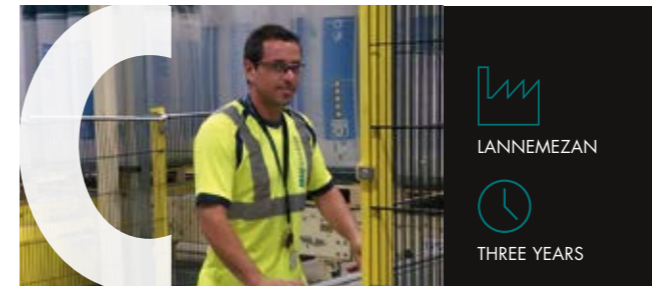
The HSE culture within our plants plays an important role. We have developed a set of expected HSE behaviours – for manager, supervisor and 'everyone' level – to create an HSE Expectations Framework.

Erkan Üçok, Plant Manager Eskisehir says: "The organisation helps to create a warm environment instead of a formal workshop. At Eskisehir, it was very positive since the voice of the employees was captured in a structured way with feedback tackled transparently."

Jan Brazda, Plant Manager Krupka, adds: "The message from colleagues was to improve feedback and recognition for those who contribute to HSE culture. Now any colleague without a record in the HSE area is recognised and awarded a gift and certificate."

HIDDEN ASSETS

There are thousands of unsung heroes working behind the scenes to make Knauf Insulation an international success. From cooks and schedulers to event managers and laboratory workers, every contribution counts.



CHRISTOPHER DAROUX

Forklift Operator

WHAT MAKES LANNEMEZAN SO SPECIAL?

I enjoy my work in the logistic service department because the working conditions are good and Lannemezan is a convenient location for me.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

I have been able to grow my career because I've always been offered new opportunities. I started as a loading operator, then as a 'flying' forklift driver where I discovered Raw Materials Storage and finally end-of-line which I'm in charge of now.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

The implementation of continuous training where I had the chance to participate in the test version as well as being involved in a project for the storage of forklifts during the day.



ELLI ZEIDLER

Chief Cook

WHAT MAKES SIMBACH SPECIAL?

I've got a great relationship with everyone here and the people I work with. And I love my job. I have the freedom to plan what works best in the kitchen and have the freedom to plan meals. It is a good feeling to be given responsibility to be your own boss.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

I enjoy the challenge of planning menus for major events and meetings here, but I think the most important highlight was the realisation that this was the job for me.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

We had a whole new kitchen installed in 2017.



SARAH PROTHEROE

Battline Operator

WHAT MAKES CWMBRAN SPECIAL?

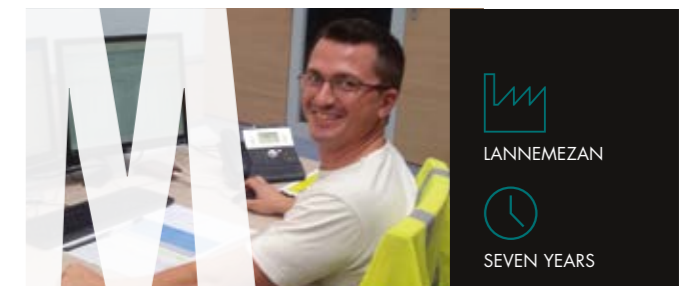
Cwmbran is special as there are opportunities for me to progress my career and everyone works as a team. I'm the only woman on the shop floor and my colleagues have made me feel happy and comfortable in my job over the past three years.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

I am now training to be a stand-in team leader which will open doors for me to progress in my career. I have also been given the opportunity to become a Values ambassador and attend meetings to discuss future projects and ways to help our community. Plant highlights include the installation of master bagger number two which has improved productivity and the time when we produced folded batts for the American market.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

It has to be the process of CI (Continuous Improvement) where everyone offers ideas on ways to improve the factory. This makes Cwmbran a safer place to work because health and safety plays an important role here.



MICHAËL DEPIS

Production Scheduler

WHAT MAKES LANNEMEZAN SO SPECIAL?

It's a great place and Knauf Insulation is a dynamic company where I can grow professionally. It's also close to my home. Since starting my adventure here, my job has become a constant Rubik's Cube. I manage the manufacture of about 330 products in the main production line and two lines of Blowing Wool of two products each.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

When I was made an assistant to my production supervisor I saw a real opportunity to advance, improve my knowledge and production experience, as well as work on continuous improvement. Six months later I was offered the job of production scheduler.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

The increase in the skill level of the site operators. At the beginning the process of continuous improvement was difficult — even with training. But after a few months we really noticed significant technical progress with a major positive impact on the operation of production lines. Another major change was the start of Thermo046 which values our scrap — the costs of waste to landfill before were spectacular.



SIMONE SCHULZ

Dispatch Handler

WHAT MAKES BERNBURG SPECIAL?

I like the fact that work is close to my home and I feel good here. I'm responsible for warehouse bookings, inventory acceptance, handling of lorries, acceptance of raw materials and visitors. The work is diverse and my colleagues are very nice. Even when it's sometimes a little stressful, it's still fun, even after so many years.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

We had an outside warehouse near the factory for which I was almost entirely responsible. It was a great job and I had a lot of fun.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

Acquisition and management changes as well as the closure of the outside facilities.



JENS REUTER

Laboratory (Quality Assurance)

WHAT MAKES BERNBURG SPECIAL?

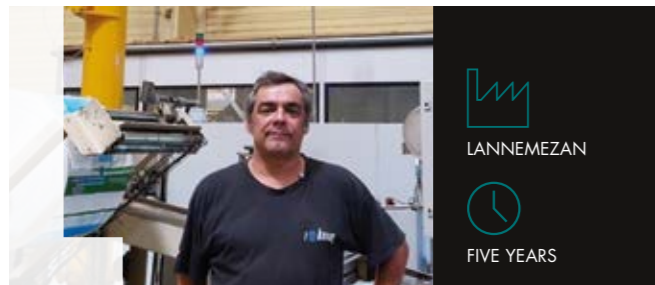
I have no interest in changing my job. I have a great working relationship with my supervisors and colleagues and there is a good working atmosphere here. My job is also varied. I work on raw material input control, material control, complaint handling and instrument examinations.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

The commissioning of the Glass Mineral Wool plant in Bernburg and the take-over of the previous company by Knauf Insulation in 2013.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

The take-over by Knauf Insulation, the conversion to ECOSE binder technology and the introduction of enhanced regulations for safety, cleanliness and quality by the new director David Lieberman.



LAURENT SUEL

Secondary Process Supervisor

WHAT MAKES LANNEMEZAN SPECIAL?

I love the region here and I'm passionate about my job, which is very varied. I started in 2009 training in Visé, Krupka, St Helens and Germany. In 2012 I became Secondary Process Supervisor at Lannemezan — in charge of training operators and batch automation — I'm also responsible for the management of the Thermo 046 machine and the recycling of materials.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

It is enabling operators from different zones achieve sustainability objectives, reduce costs and maximise equipment life. Acting as an interface between different teams and passing on knowledge to new generations is very rewarding.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

Through commitment and team work we have achieved great recycling results in a short space of time. Waste has decreased by 70% since 2012 thanks to commitment, team work, resource management and initiatives such as Thermo — a recycled brown Blowing Wool — or end-of-spool plastic that is sold to an external company.



PIA HEYER

Sales Travel & Events Manager

WHAT MAKES SIMBACH SPECIAL?

It's the people here. I love my job organising events, customer meetings and supporting my colleagues. I love to work with people. It's like big family at Simbach. We've know each other a long time and we've experienced each other's ups and downs and that makes our friendship together very special.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

About three years ago I visited some of our colleagues in Visé and Krupka. For years I'd been speaking to them by email and phone — it was fantastic to finally meet them to speak to them face-to-face.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

It's the building of the new Knauf headquarters here. Look outside the window you can see the work starting on a new building for our teams.



GEORG PIERINGER

Head Electrician

WHAT MAKES IT SPECIAL?

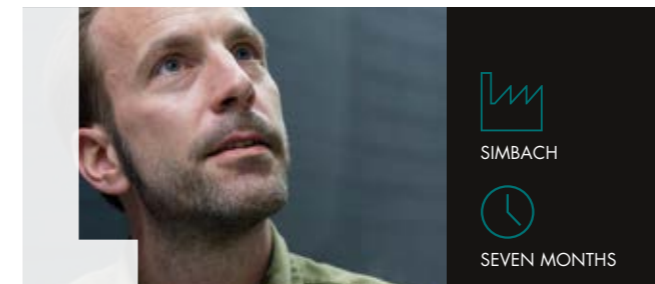
There have been constant changes and new challenges and that is very stimulating for me. I have enjoyed good companionship for many years here and that is very important. And I have always been offered opportunities to grow and take on challenging new responsibilities — from my first apprenticeship here when I was sixteen to today. I am always learning and what I learn is then taught to a new generation, that keeps everything fresh.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

Too many to mention, but the constant introduction of new technology and machines brings new challenges and the chance to learn new things.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

Definitely the technological change. Over there, we were using the forge and anvil to make parts until the 1980s, now so much has been digitised.



LUTZ MIESEN

Chief Engineer

WHY ARE YOU HERE?

After 20 years in seafaring I had run out of developmental possibilities and was ready for a change. I wanted a chief engineer job working in a complex environment and that is what I have now. When I was invited to Simbach, I saw the job as a great 'top to bottom' opportunity to combine strategic planning and maintenance with getting my hands dirty.

WHAT MAKES IT SPECIAL?

I've only been here a short time and I really appreciate the plant's fantastic atmosphere and the camaraderie.

WHAT DO YOU SEE AS A FUTURE HIGHLIGHT?

Knauf Insulation wants to develop the potential of this site and that is very exciting. I'm looking forward to playing a part in its future.



SUSAN NOVAK RAZZAKOVA

Plant Assistant

WHAT MAKES KRUPKA SPECIAL?

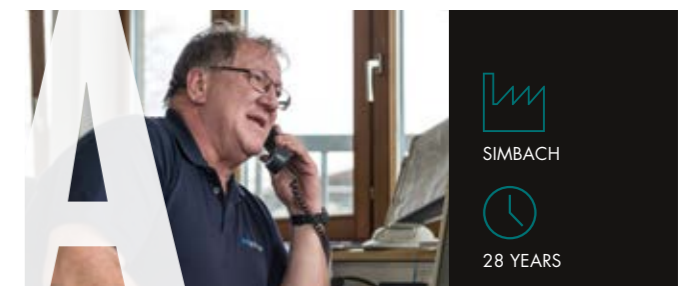
Our plant is a reflection of its workforce. Our people are committed, open to change, creative, talented, hard-working and highly skilled.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

I'm proud that I was an original member of the Krupka plant start-up team. It was incredible to see the transformation of a vacant site into a sophisticated plant in just 10 months.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

Krupka town has been transformed by Knauf Insulation and the plant. There was no proper bus network when we started. Now there are bus services for our colleagues and neighbours. Children's playgrounds as well as parks have also been revitalised. Our company cares a great deal about the community — particularly the elderly and vulnerable — and supports local schools, special projects and sports clubs in the region.



ALOIS ZAGELOW

Information Point Controller

WHAT MAKES SIMBACH SPECIAL?

I'm responsible for the arrival of customers, employees, trucks, deliveries... there is always a variety of things to do and I like the people who work here and the constant change of tasks involved in my job. One minute it is manning the phone the next it could be coordinating drivers and helping visitors.

WHAT HAS BEEN A MAJOR HIGHLIGHT?

It's not a traditional 'highlight', but in 2003 I was the first to make the call to the emergency services when the plant caught fire. Police, ambulances and about 30 fire trucks from 15 brigades attended the blaze. Fortunately nobody was injured and the damage was not too extensive — although the plant was closed for two weeks.

WHAT'S THE BIGGEST CHANGE YOU HAVE SEEN?

I think it's when the Knauf Group acquired Heraklith in 2006 and made the plant its headquarters.

SAFETY FIRST

We are introducing new initiatives to ensure that health and safety is the responsibility of everyone with the help of expertise from our operators.

LOST TIME ACCIDENTS AT KNAUF INSULATION HAVE BEEN REDUCED FROM 103 TO 69 IN 2016, MARKING A DECREASE OF 33%.

"We are pleased with this success, but with health and safety there is never room for complacency. Incidents still happen, for example, a near fatal accident happened at one of our plants in early 2017 so it is absolutely vital that we constantly question ourselves about how and why such situations can occur," says Jef Snackaert, Knauf Insulation's Group HSE Director.

2017 has been designated the year of shop-floor improvement — an integral part of what is known as Continuous Improvement which is designed to tap into the expertise of operators to make plants more efficient and safer places to work.

"Constant self-analysis of health and safety is vital to Continuous Improvement and that is why we continue to streamline, simplify and improve our procedures and programmes," says Jef.

New health and safety initiatives are being rolled out to help reinforce this process. These include:

STEPPING UP TRAINING

The Institution of Occupational Safety and Health (IOSH) 'Managing Safely' training certificate is respected throughout the industry. Following a pilot IOSH training programme at our Skofja Loka plant, the plan is to roll out the training across key company leaders, including Plant and Regional Management Teams.

SAFETY FOCUS

The courses provide the critical skills and knowledge to take practical action to improve health and safety management in the workplace.

SHARPENING SAFETY AWARENESS

The Guidance to Personal Safety (GPS) programme was developed by our North American division and is designed to sharpen safety awareness and commitment for colleagues who are new to the company but also for those who have intentionally violated one or several critical safety rules. At the beginning of a three-month programme these colleagues agree upfront with their supervisor a detailed Individual Safety Plan, including activities such as reporting safety ideas, performing a number of hazard spotting tours, taking part in a risk assessment or root cause analysis investigation.

SAFETY FOCUS

The aim is to roll out the programme to all plants in 2017.

TAKING TIME OUT FOR SAFETY

Looking for input from the workforce produces new ideas and opportunities to further develop a strong health and safety culture. The aim of a Safety Time Out is to stop production and bring all employees together in one place and discuss openly opportunities to further improve the site's safety performance.

SAFETY FOCUS

Safety Time Outs are an ideal platform to engage with employees, seek their input and make them part of a solution.

PROTECTING PEOPLE WITH LIFE-SAVING RULES

Our Life Saving Rules protect people from proven hazards that can result in serious injury if violated. Working safely is a cornerstone of our company and a condition of employment for anyone who works with us.

SAFETY FOCUS

Violations of these rules are taken extremely seriously and are thoroughly investigated. After weighing up facts and merits in line with what is known as a 'Just Culture Decision Tree', a violation may result in disciplinary action up to employment termination in a case of unjustifiable and intentional grave violations.

**A TOTAL OF 3,160
HAZARD SPOTTING
TOURS ACROSS
OUR PLANTS WERE
CARRIED OUT
IN 2016**

DOUBLE SUSTAINABILITY SUCCESS

Two of our key 2020 sustainability targets were achieved in 2016 following a 20.9% reduction in energy use and a 25.1% cut in CO₂ emissions.

In 2010 we set ourselves two critical aims – to reduce our energy use and CO₂ emissions by 20% by the year 2020. We are delighted to announce that in 2016 we exceeded both.

Across Knauf Insulation we cut energy use by 20.9% and CO₂ emissions by 25.1%.

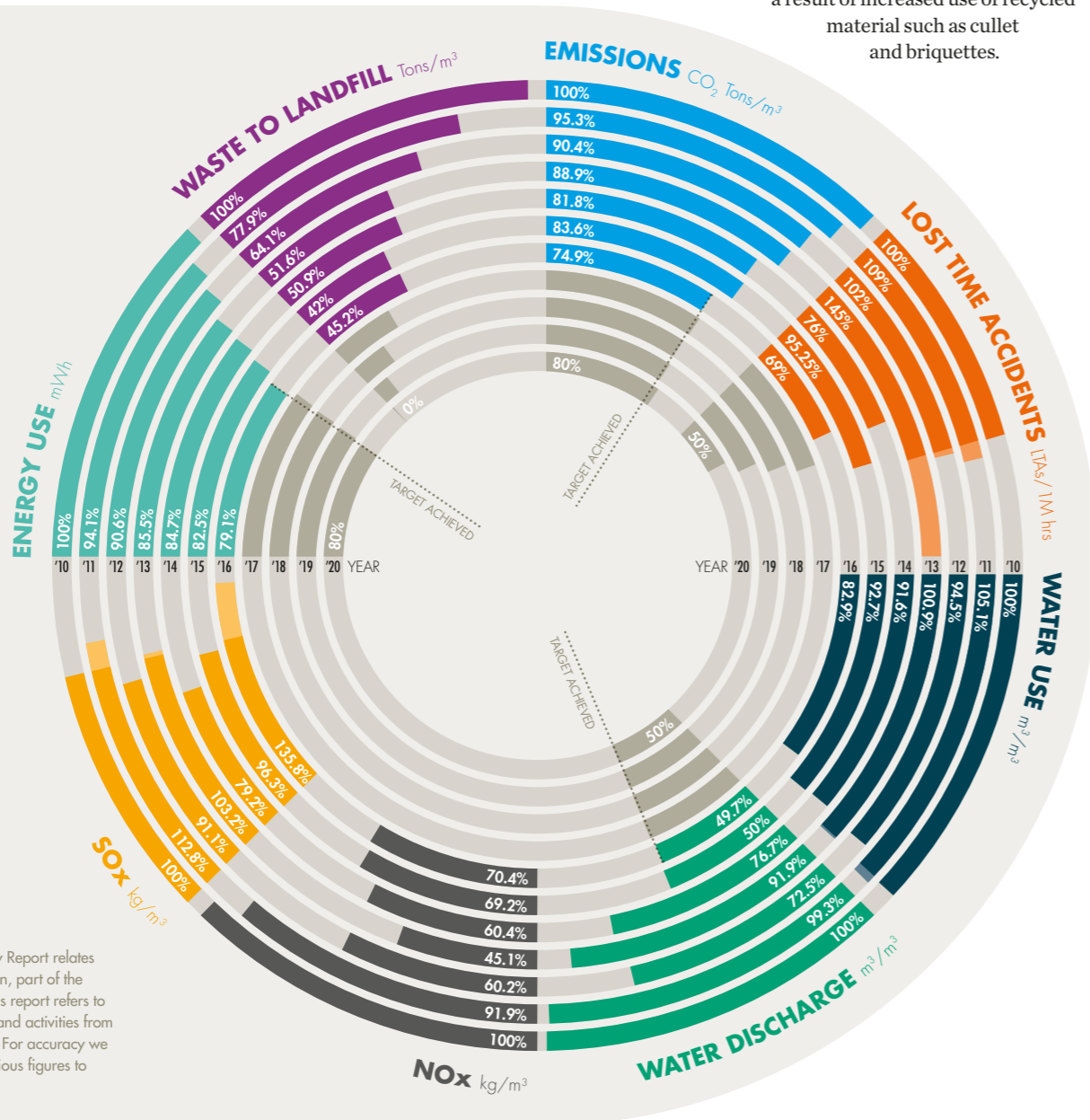
“2016 is a major landmark for the company. In just six years we have managed to achieve two of our most important 2020 sustainability goals,” said Philippe Coune, our Group HSE, Performance & Sustainability Manager.

“Such an incredible achievement is a tribute to the huge commitment from everyone across the company to improve energy management every single day and the future vision of the company to invest in cleaner, more efficient technology.”

“We should be very proud of what we have achieved in such a short period of time and I’m looking forward to building on this success in the years to come.”

In other areas, we have achieved a reduction in waste to landfill of 54.8% compared to our 2010 baseline and, over the same period, decreased water use by 17.1% and cut water discharge by 49.7%.

Our NOx emissions have remained static, but our SOx emissions have increased by 35.8% compared to 2010 as a result of increased use of recycled material such as cullet and briquettes.



This Sustainability Report relates to Knauf Insulation, part of the Knauf Group. This report refers to data from 2016 and activities from 2016 and 2017. For accuracy we may amend previous figures to new definitions.

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

United Nations countries have adopted a series of Sustainable Development Goals with the aim “to end poverty, protect the planet and ensure prosperity for all” by 2030. Here is how Knauf Insulation is contributing to these goals:



3. GOOD HEALTH AND WELL-BEING

UN goal: ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development.

We create products – such as Heraklith Wood Wool or our solutions with ECOSE Technology – that enhance building comfort and contribute to improved acoustic health and air quality. Besides our internal policy states we are committed to “ensure the health, safety and welfare of our employees and anyone else affected by our activities... and strive to continually improve our safe working environment”.

9. INDUSTRY, INNOVATION AND INFRASTRUCTURE

UN goal: investments in infrastructure – transport, irrigation, energy and communications technology – are crucial to achieving sustainable development.

Knauf Insulation is committed to the creation of near-zero energy-use buildings and supports campaigns for the energy-efficient renovation of existing building stock to be considered as infrastructure investment. Throughout our company we ensure “continual improvement in performance with regard to matters of product quality, energy, environment and health and safety.”

10. REDUCED INEQUALITIES

UN goal: to reduce inequality, policies should be universal in paying attention to the needs of disadvantaged and marginalised populations.

Knauf Insulation believes that the energy-efficient renovation of buildings must play a role in reducing the fuel poverty that impacts 11% of Europeans.

11. SUSTAINABLE CITIES AND COMMUNITIES

UN goal: to create cities of opportunities for all with access to basic services, energy and housing while improving resource use and reducing pollution and poverty.

Our public affairs teams campaign worldwide for more energy efficient buildings to create a more sustainable future for our cities and communities. Many of our products are created from recycled materials, while systems such as our Urbanscape® Green Roof Solution contribute to efficient stormwater management.

12. RESPONSIBLE CONSUMPTION AND PRODUCTION

UN goal: sustainable consumption and production aims at ‘doing more and better with less’.

Our Glass Mineral Wool is made with up to 80% recycled glass, while our Rock Mineral Wool contains recycled steel slag. We are on target to produce zero waste from manufacturing sites to landfill by 2020. We are committed to “having zero negative impact on resource use” in line with our company policy.

13. CLIMATE ACTION

UN goal: climate change is impacting lives worldwide. Implementation of the Paris Agreement – to limit global temperature rise – is essential to achieve the UN’s sustainable development goals.

Knauf Insulation is a strong supporter of the Paris Agreement and our company is dedicated to the manufacture of solutions that help tackle climate change. Besides we have already reduced our company’s CO₂ emissions by 25% since 2010.

15. LIFE ON LAND

UN goal: deforestation and desertification caused by human activities and climate change – pose major challenges to sustainable development.

All material for our Heraklith Wood Wool is sourced from woods audited by the Forest Stewardship Council or Programme for the Endorsement of Forest Certification. Our Urbanscape Landscape Solution has also been used to help sustainable development of green areas of Middle Eastern desert.

16. PEACE, JUSTICE AND STRONG INSTITUTIONS

UN goal: peaceful, inclusive and sustainable societies are built on access to justice for all and effective, accountable institutions.

Our code of conduct highlights our commitment to ethical and lawful conduct, fair competition, a rejection of corruption and bribery in any form, a pledge to fair conditions of employment, tolerating no discrimination and an obligation to protect the environment and natural resources.

17. PARTNERSHIPS

UN goal: successful sustainable development requires partnerships between governments, the private sector and civil society.

Knauf Insulation works with policy makers and non-profit organisations to promote issues related to better sustainable buildings from improved fire safety to better energy efficiency.

The fact that we have already achieved our 2020 target of reducing energy use by 20% is a major tribute to everyone at Knauf Insulation.

In 2016 our energy use was 20.9% lower than our 2010 base year and 3.4% lower than 2015.

There have been many factors that played a role in this achievement including a company-wide commitment to continuous training, constant checks, reinforcing efficiency awareness, regular feedback from operators, the sharing of best practices and the installation of new cleaner technology.

Our North American plants in particular have contributed significant reductions to the overall figure. Production improvements have been implemented marking a decrease of 35% in US energy use in 2016 compared to 2010.

Adding further momentum to our energy-saving initiatives has been a dedicated focus on ISO recertification in all our manufacturing plants.

Berin Onur, Group HSE Manager Systems Processes & Energy, said: *“Achieving recertification of all four standards – ISO 9001 (Quality Management), ISO 14001 (Environmental Management), ISO 50001 (Energy Management) and OHSAS 18001 (Occupational Health and Safety Management) – is testament to the hard work of colleagues from across our regions to honour our commitments to continuous improvement across all key sustainability metrics.”*

In 2010, Knauf Insulation was one of the first companies in its sector to achieve all four standards for European, US, Russian and CIS plants. The latest achievement is significant because four new plants – Albion, Inwood, Ajdovščina and Eskisehir also received certification.

LOCAL INITIATIVES

VISÉ, BELGIUM

Our packaging system zone at Visé is now energised by solar power following the installation of 920 photovoltaic panels – around 1,500m² – on the plant’s warehouse roof. The panels offer a total capacity of +/-250kW peak power.

ST EDIGIEN, GERMANY

Our St Edigien plant achieved an impressive 9% reduction in energy use for compressed air resulting in 170 MWh less consumption. The reduction is the result of regular surveys, frequent plant tours and awareness training.

AJDOVŠČINA, SLOVENIA

HSEEQ manager Natalija Domjanič received our East European HSEEQ Leadership Award for her work with the team at Ajdovščina. In addition to HSE successes, implementation of KIMS for our ISO standard certification by Bureau Veritas, improvements were achieved in energy management, particularly compressed air handling and lighting performance.

ALBION, NORTH AMERICA

New power monitors and a public data base at Albion enabled the plant to balance system loading to reduce energy and cut the operating pressure of the air system from 105 psi to 95 psi. Other initiatives included leak monitoring and fixes; the installation of LED lights and energy awareness meetings. A further 7.5 million btu was saved in heating energy by closing off plant exterior walls using unsaleable insulation panels.

KRUPKA, CZECH REPUBLIC

Krupka’s energy management was described as *“well implemented and a strong part of the integrated system with improved knowledge and communication on a plant level”* by auditors Bureau Veritas. The comments came following recertification in ISO 9001 (Quality Management), ISO 14001 (Environmental Management), ISO 50001 (Energy Management) and OHSAS 18001 (Health and Safety Management)

NORTH AMERICA

Our North American plants have seen a dramatic 35% decrease in energy use in 2016 compared to 2010 as a result of production optimisation. Measures such as the reduction of fiberisation units, the introduction of variable speed fans and improved energy measuring have all contributed to the reduction.

WATER

We have seen a decrease in water use of 9.8% in 2016 compared to 2015 and our water discharge has been cut by 0.3% during the same period.

In 2015 we celebrated a breakthrough year after achieving our 2020 target of reducing water discharge by 50% compared to our 2010 baseline year.

As for water use across the company, we have cut our usage by 17.1% compared to 2010 following a series of key initiatives such as using river water instead of potable water, the installation of wells and a major project at St Edigien.

LOCAL INITIATIVE

KRUPKA, CZECH REPUBLIC

The installation of a 161m-deep water well at Krupka has released huge reserves of non-drinkable ‘ground water’ for our manufacturing processes and cut the plant’s use of city drinking water by 30%.

In a landmark year that has already seen us achieve our 2020 energy saving target – we are delighted to announce that we have also cut our CO₂ emissions across the company by 25.1% compared to our 2010 baseline year.

“Our 2020 CO₂ target was a reduction of 20%, so to surpass that by 5% is a great achievement and – as always – a tribute to the dramatically improved awareness of energy use at our plants,” said Philippe Coune, our Group HSE, Performance & Sustainability Manager.

“The reduction is also in part down to a move to better technology. We have replaced two of our coke fuelled melters with gas systems which has helped contribute to lower emissions.”

While emissions of NOx have remained static from 2015 to 2016, emissions of SOx have increased by 39.5% during the same period.

“Across the company we are using more and more recycled material in the form of glass cullet and briquettes. Increased SOx emissions are unfortunately the inevitable result of using more of this material,” said Philippe.

WORLDWIDE

Knauf Insulation is pioneering the introduction of hybrid and full-electric cars across the company. More than 900 company cars are used by colleagues in Europe, Russia and North America and plans are underway to reinforce the incentive scheme and move the environmentally-friendly car fleet to the next level. *“We have not heard of any other major company carrying out a switch to green company cars on such a scale and we are delighted to be at the forefront of such a major commitment,”* said Patrice Briol, Knauf Insulation’s Group Human Resources Director.

Our company-wide goal is to convert our entire product range to ECOSE Technology. ECOSE Technology is made without the addition of any acrylic or artificial dyes and is mainly derived from rapidly renewable materials and contains no added formaldehyde. Our Glass Mineral Wool with ECOSE, for example, is certified by Eurofins Gold as an ‘outstanding material’ according to the Volatile Organic Compounds Indoor Air Quality emissions regulation.

LOCAL INITIATIVES

ST EDIGIEN, GERMANY

To achieve our target of cutting CO₂ emissions by 20% from our baseline year of 2010 to 2020 requires a reduction of 2% each year. At St Edigien we achieved a reduction of 3% from 2015 to 2016. This was as a result of the database storage of best practice settings from all operators which show shifts’ best practice energy performance indicators and stable processes. Energy consumption is also analysed on a daily basis and deviations tackled with best practice behaviour settings. The initiative has also seen compressed air consumption drop by 9%.

WASTE

2016 saw a slight increase of 3.2% in the amount of waste we send to landfill compared to 2015.

However, we are still on track to achieve our 2020 ambition of zero waste with an overall 54.8% reduction since 2010.

Company-wide our Nova Marof and Krupka plants continue to maintain their zero-landfill status while most of our UK plants returned to zero after sourcing suppliers who are able to use our waste for other products such as tiles.

So, what is behind the 3.2% increase? The start-up of a new production line at our Lanett and St Edigien plants lead to higher scrap rate, while St Helens is now in the process of sourcing a waste-handling supplier after being zero waste to landfill for many years.

LOCAL INITIATIVES

ST HELENS, UK

A new £10 million facility next to our St Helens plant will refine tens of thousands of tonnes of recycled glass into ‘furnace ready cullet’ that can be fed into the plant and spun into Mineral Wool. The furnace-ready glass reduces waste to landfill and keeps high quality glass in circulation.

STUPINO, TYUMEN, RUSSIA

Stupino has cut the amount of waste to landfill by 80% from 2015 to 2016. Rather than sending line bale scrap to landfill, the plant is now selling it as raw material for ceiling tile production. At Tyumen waste to landfill has been reduced by 40% following a separate plant waste collection initiative for external recycling and plans are underway to also sell bale scrap from the line.

SIMBACH, GERMANY

Off-cuts from our Simbach plant are being used as secondary material at our St Edigien plant in Germany.

GROWING OPPORTUNITIES

A new €100 million plant and significant investment at seven key facilities in Europe and North America underline our position as a leading player in the global insulation market.

Knauf Insulation has announced plans for a new €100 million Rock Mineral Wool plant in Europe following major production upgrades at seven key plants around the world.

With a production capacity of over 110,000 tonnes of Rock Mineral Wool, the new state-of-the-art plant will be located in the border region of Luxembourg and France and is expected to create up to 120 new jobs when it starts production in 2019.

"We have seen significant market growth in the Rock Mineral Wool market in the West of Europe as the result of new regulation and this investment further affirms Knauf Insulation's position as a leading player in the global insulation market," said Mark Leverton, our Regional Managing Director for Western Europe.

"The new facility will not only meet increased demand for our Rock Mineral Wool in France, Germany, Belgium and Luxembourg but also optimise new technology and product solutions that will ultimately enhance our customers' experience."

The key focus of the plant will be on the supply of construction applications such as contact and ventilated facades, flat roofs and metallic sandwich panels.

The announcement of the new facility follows significant investment at seven other Knauf Insulation plants.

To meet increasing demand in Eastern and Central Europe, the line at our Rock Mineral Wool plant at St Egidien in Germany was upgraded in early 2017 following major line improvements at Nova Bana in Slovakia and Skofja Loka in Slovenia.

Upgrades are now also planned at our facilities at Surdulica in Serbia and Nova Bana in Slovakia and our Visé plant in Belgium will restart its second line by the end of 2017.

Our North American customers will also benefit from the restart of our second line at our Inwood plant in West Virginia to support the growing demand for insulation and a preference for Knauf Insulation solutions.

Our CEO, Jean-Claude Carlin said: *"These investments are designed to be real game changers in terms of improving service to our developing customer base and also driving product quality to new levels."*

"We remain committed to maximising our global footprint through investing in improvements and increasing production capacity where necessary particularly in Europe where there is a strong regulatory framework. However, we have also identified some exciting opportunities for geographical expansion outside of Europe in the coming years."

2016 INVESTMENTS



ST EGIDIEN



FOUNDED 1968

ACQUIRED BY KNAUF INSULATION IN 2017

INVESTMENT: UPGRADED LINE

800 EMPLOYEES AT KNAUF INSULATION CENTRAL EUROPE



NOVA BANA



FOUNDED 1907

INVESTMENT: MAJOR LINE IMPROVEMENT

255 EMPLOYEES



ŠKOFJA LOKA



FOUNDED 1959

INVESTMENT: MAJOR LINE IMPROVEMENT

400 EMPLOYEES



SURDULICA



FOUNDED 1974

ACQUIRED BY KNAUF INSULATION IN 2005

INVESTMENT: UPGRADED LINE

100 EMPLOYEES



VISÉ



FOUNDED 1979

INVESTMENT: RESTART OF A SECOND LINE

350 EMPLOYEES



INWOOD



ACQUIRED 2014 BY KNAUF INSULATION

INVESTMENT: RESTART OF A SECOND LINE

226 EMPLOYEES

WHAT'S NEXT

A NEW PLANT IN THE



FRANCE/LUXEMBOURG BORDER REGION PRODUCTION TO START IN 2019

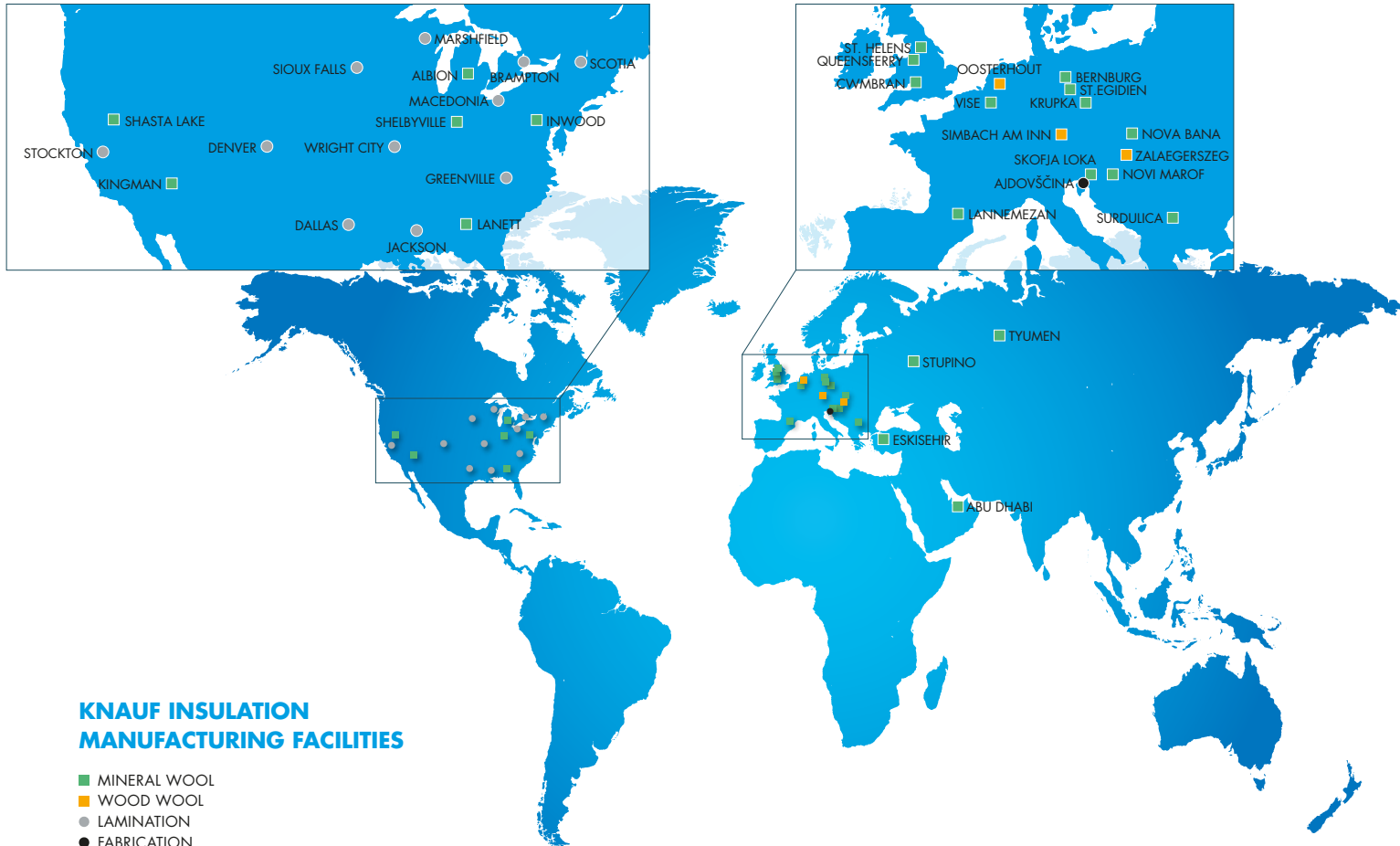


PRODUCTION CAPACITY

110,000 TONNES



120 NEW JOBS



KNAUF INSULATION MANUFACTURING FACILITIES

- MINERAL WOOL
- WOOD WOOL
- LAMINATION
- FABRICATION

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