

Impact

low-impact

Sustainability Report 2018



Building a better future

For more than 80 years, we have been providing safe, sustainable products that help people thrive. Today, we are insulating and cladding the walls of great buildings and everyday homes to create safe spaces and lower emissions. We are enabling modern horticulture to feed thousands of people more resource-efficiently. And every day, we learn new ways to help societies be better for everyone.

In this report you'll find out how we're developing innovative new options to tackle climate change, support the move to a circular economy and enhance the wellbeing of people around the world. You'll also see how our work is creating measurable progress on the United Nations Sustainable Development Goals (UN SDGs).

This is our sustainability story.

Who we are

ROCKWOOL uses rock to produce stone wool and create fire safe insulation, cladding, acoustic ceiling and wall tiles, urban flood management products and horticulture solutions. We are the world's leading manufacturer of engineered stone wool products, delivering specialist options for the building, horticultural, marine, transport and offshore sectors through our five key brands.

Five brands with one common purpose

To release the natural power of stone to enrich modern living.



ROCKWOOL at a glance



Founded more than
80 years
ago



11 600
employees



61
nationalities



45
manufacturing facilities



39
countries of operation

A positive impact for all

Core elements of sustainability

Enriching modern living is fundamental to everything we do. We extensively measure how our products and processes contribute to three core elements of sustainability. Everything we produce helps combat climate change, grow the circular economy or safeguard citizens' wellbeing.

What's inside

Introduction

- 04 Building a more sustainable future
- 05 A year of highlights
- 06 The Global Goals steer our ambitions
- 07 Committed, together

Combating climate change

- 09 Beating the 2°C challenge
- 10 Renovate today to reshape tomorrow
- 13 Protecting people with stone
- 14 Minimising our operational climate impact

Growing the circular economy

- 17 Future proofing growth
- 18 Solutions for a circular society
- 20 Taking a lifecycle approach to buildings
- 21 Regenerating food supplies
- 22 Towards a smaller footprint

Safeguarding citizens' wellbeing

- 25 Safer, healthier societies
- 26 Enabling safe spaces
- 28 Enhancing acoustic performance
- 30 Doing more for the people behind our products
- 32 Helping communities thrive

Sustainability factbook

- 35 Managing sustainability
- 36 Materiality
- 37 Operating as an ethical business
- 38 2030 sustainability goals
- 39 Key performance metrics

ROCKWOOL solutions

Positive societal impact

Combating climate change



ROCKWOOL insulation is one of the most cost-effective solutions to cutting building energy use and CO₂ emissions, now and for decades.



Energy efficiency contributes 40 percent of emission reductions in low-carbon scenarios that are designed to achieve the Paris Agreement's ambitions.



Our pioneering Rockflow offers new types of urban water management solutions.



As the effects of climate change increase, communities will need better defences against urban flooding.

Growing the circular economy



Grodan's solutions enable increased yields with less water, land and fertilisers.



As our population grows, we need to feed more people using fewer natural resources.



Our circular business model helps us turn waste into new raw materials and take back and recycle construction site waste and used products.



Embracing circularity minimises resource consumption and waste to landfill.

Safeguarding citizens' wellbeing



Thanks to excellent thermal and acoustic properties, our products support healthier schools, hospitals and other buildings.



In an increasingly urban world, people need comfortable, quiet places to live, learn, work and recover.



Our insulation withstands temperatures greater than 1 000°C and can help prevent fire from spreading.



Non-combustible insulation improves building resilience and helps keep people safer indoors.

Building a more sustainable future

Welcome to ROCKWOOL's 2018 Sustainability Report

You may notice it looks a little different. That's because we've decided to report on the three core elements where we believe our products provide the greatest positive impacts, namely: combatting climate change; growing the circular economy; and safeguarding citizens' wellbeing.

It's a privilege to lead a company whose products are on the cutting edge of solving some of society's greatest challenges, foremost among those being climate change. The positive impact of our products is overwhelming. For example, our building insulation sold in 2018 over the lifetime of its use saves about 100 times the carbon emitted in its production. Our new Rockflow product is helping cities and towns to deal with local flooding that can result from extreme weather events.

Across the full range of our products and operations, ROCKWOOL is dedicated to enriching modern living. In reading this year's Sustainability Report, I hope you will feel the same energy and passion that motivates and inspires each ROCKWOOL employee. Good reading!



Putting renovation on the agenda

In 2018, we saw many stakeholders reinforce their commitment to achieving the ambitious targets set by the Paris Agreement – ROCKWOOL was no exception.

We produce one of the most potent and cost-effective solutions to the climate crisis. It's difficult to overstate just how much impact stone wool could have on carbon emissions – and how quickly.

Today, buildings consume 30 percent of the world's energy use. By renovating and filling them with high-quality, recyclable and fire-resistant insulation such as ROCKWOOL's we could reduce the heating demand of buildings by 70 percent.

2018 was the year that ROCKWOOL put renovation on the agenda, kicking off with a global awareness campaign at the New York Climate Week in September. We provided research, advice and support as part of our impact-focused collaborations, including with the C40.



Creating circular solutions

As resource constraints become ever more challenging, taking a lifecycle approach bolsters our contribution to growing the circular economy and reducing the negative environmental impacts that population and economic growth can sometimes generate. In 2018, we recycled approximately 130 000 tonnes of stone wool from the market and doubled the number of countries in which we offer recycling programmes – and we're aiming to increase that number threefold by 2030. We're also working to reduce the waste we send to landfill as well as our own water consumption and the energy and carbon intensity of our production processes.



Working for safer, healthier societies

Safety and wellbeing is at the heart of what we do. That commitment starts with our 11 600 employees and everyone else who works for or visits us, with practices and processes guided by leading safety and occupational health management principles.

Sadly, however, we experienced a workplace fatality in 2018, our first since 2012. Our colleague was only 24 years old and had been working with us for eight years, having started his career in ROCKWOOL as an electrician apprentice. His loss touched me and many others at ROCKWOOL very personally. We have redoubled our efforts to ensure the continuous safety of our colleagues.

Our commitment to safety and wellbeing extends to our products as well, which include non-combustible insulation and cladding that help stop the spread of fire as well as our acoustic ceiling tiles that reduce unwanted noise and help create healthier, more productive and less disruptive indoor environments.

We achieved a lot in 2018, but there's still plenty of work to be done. Everyone at ROCKWOOL is committed to building a safer, healthier, more productive and more sustainable future. That's the passion that drives us forward each and every day.

Jens Birgersson, CEO

A year of highlights

Combatting climate change

Launch of new innovative wall system

Rockzero

– pioneering nearly zero-energy homes built with stone wool.



ROCKWOOL technical insulation sold in 2018 can save energy in its lifetime equal to

57% of the total annual energy use in the U.S. industrial sector.

CO₂ intensity reduction from production of

4%

against the 2015 baseline year.



Launched the global renovation campaign '**Renovate today. Reshape tomorrow**' based on collaborative research.



Growing the circular economy



Recycling services in

5 more countries.

Grodan products sold in 2018 will save an estimated

94 million

litres of water.



ROCKWOOL became the Trucost SDG Evaluation Tool's **highest scoring company**.

Grodan growing solutions enabled

76%

more vegetables to be grown compared to soil-based horticulture.



Prime rating for sustainability with ESG rating agency ISS-oekom for the third year running.

Safeguarding citizens' wellbeing

Consistently advocated for use of **non-combustible insulation** in high-rise and high-risk buildings.



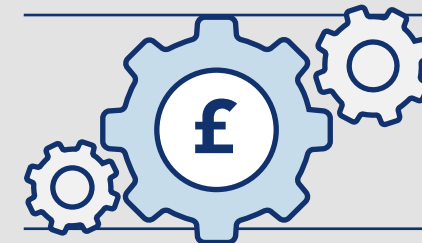
The acoustic solutions Rockfon delivered to schools in 2018 improved the learning conditions of more than

300 000

students globally.

3.1

Lost Time Incident rate in 2018.



Living Wage accreditation in the UK.

Global employee engagement campaign on the UN Sustainable Development Goals.



The Global Goals steer our ambitions

ROCKWOOL has made a commitment to drive an increased positive contribution to 10 UN Sustainable Development Goals (SDGs) – also called the Global Goals. We evaluate our SDG performance based on the effects of our products as well as our operational impacts. We track our performance through a combination of sustainability goals and product impact metrics where possible.

This year, we were one of the first companies to be assessed by the Trucost SDG Evaluation Tool, which quantitatively analyses a company's performance on the SDGs. ROCKWOOL achieved the highest score, with **100 percent of the Group's products being classified as SDG positive.**

Examples of our quantified 2018 # product impact on the SDGs

200 million tonnes of CO₂ avoided in the lifetime of **building insulation** sold in 2018 (SDG 13)¹

5 400 TWh heating energy saved in the lifetime of **technical insulation** sold in 2018 (SDG 7)²

94 million litres of water saved by greenhouse growing products sold in 2018 (SDG 6)³

300 000 students benefited from better learning environments with Rockfon acoustic solutions (SDG 3)⁴

130 000 tonnes of stone wool product waste collected for recycling in our reclaimed waste schemes (SDG 12)⁵

Increasing our positive impact

We are increasing our positive impact on people and society by maximising our positive product impact and minimising our operational footprint.

Product impact metric ★ Our sustainability goals



¹ Calculation methodology can be found at www.rockwoolgroup.com/carbon-impact
² Calculation methodology can be found at www.rockwoolgroup.com/carbon-impact
³ Calculation methodology can be found at www.rockwoolgroup.com/precision-growing-impact
⁴ Calculation methodology can be found at www.rockwoolgroup.com/acoustic-impact
⁵ See Product impact metrics in the [Sustainability factbook](#) at the back of this report.

Committed, together



Engaging to multiply impact

In June 2018, we launched the [iRockGlobalGoals](#) employee campaign to build a sense of community and personal ownership of ROCKWOOL's solutions to the Global Goals. We invited employees to express what sustainability means to them and share their story of driving progress towards a global goal.

The one-month campaign was launched by 30 employee ambassadors in our global business units.

The campaign achieved a very high level of engagement, increasing the employees' awareness in their role in driving progress on the Global Goals.



China



Denmark



Germany



France



Poland



United States



energy
saving
built-in

Buildings consume 30% of global energy use and generate 28% of all carbon emissions¹. ROCKWOOL's insulation turns the spaces that shape our lives into a solution for climate change.

Energy saving built-in.

Beating the 2°C challenge

Without significant changes, our society will not meet the “well below 2°C” goal set by the Paris Agreement, let alone the 1.5°C scenario. Since energy efficiency contributes over 40 percent of carbon emission reductions in all low-carbon 2°C scenarios², we need a step-change in our approach to energy. And as energy demand is predicted to rise by up to 27 percent by 2040³, we must focus on efficiency, in addition to renewable energy.

Energy efficiency boosts productivity and economic growth. Out to 2035, it's estimated that the annual increase in GDP from capturing cost-effective energy savings would be 1.7 percent in the United States and 1.1 percent in Europe⁴.

Buildings currently consume 30 percent of the world's energy use⁵, but they can also deliver by far the most carbon emission savings of any sector for the same level of investment⁶.

2018 was the year that ROCKWOOL put renovation on the global agenda with the campaign 'Renovate today. Reshape tomorrow'. It was launched at the New York Climate Week and supported by solid research and effective collaborations.

As the latest example, ROCKWOOL has now joined the Global Alliance for Buildings and Construction, which is a global alliance supporting the transition towards a low-carbon, energy-efficient and resilient buildings and construction sector⁷.

How we're supporting the UN SDGs



SDG 7 – Products:

Insulation improving the energy efficiency of buildings and industry.



SDG 11 – Products:

Insulation supporting more affordable housing and less energy poverty.



SDG 13 – Products:

Insulation strengthens resilience by saving carbon emissions from buildings and industry.

Operations:

Reducing CO₂ emission intensity in factories.



SDG 17 – Products:

Engaging in effective collaboration within key business areas across sectors and geographies.



40% of all carbon emission reductions in low-carbon 2°C scenarios come from energy efficiency.



70% – the heating energy savings stone wool insulation can contribute in buildings.



660 million tonnes of carbon could be saved by retrofitting Europe's buildings with stone wool insulation – or twice the annual emissions of France.

In this chapter

- 10 Renovate today to reshape tomorrow
- 13 Protecting people with stone
- 14 Minimising our operational climate impact



Jens Birgersson, CEO,
New York Climate Week, September 2018

¹ Global Alliance for Buildings and Construction, 'Global Status Report 2018'.

³ Calculation conducted by Material Economics, 2018 based on IPCC AR5 Database, 2018.

⁵ IEA World Energy Outlook 2017.

⁴ IEA World Energy Outlook 2012.

⁶ Global Alliance for Buildings and Construction, 'Global Status Report 2018'.

⁷ IPCC, 'Climate change 2007 – Mitigation of climate change'.

⁸ <https://www.globalabc.org/about-gabc/introduction>

Renovate today to reshape tomorrow

Globally, more than 50 percent of existing buildings will still be in use in 2050⁸. In OECD countries, the number is as high as 75–90 percent. These buildings may be renovated only once more before 2050⁹. That means that we need to exploit this opportunity now.

The International Energy Agency estimates that only 20 percent of the economically viable energy efficiency potential of buildings is exploited¹⁰.

The EU recently presented a strategy for a climate-neutral Europe by 2050 – “A Clean Planet for all”¹¹. It is estimated that up to 97 percent of Europe’s building stock needs partial or deep renovation to be in harmony with the long-term strategy. Achieving this would require a doubling of the renovation rate by 2050¹².

Buildings offer a much more cost-effective pathway to reducing carbon emissions than any other sector. Europe, for example, could save €22 billion using among others stone wool insulation to save energy and thereby reduce CO₂ emissions rather than generating additional renewable energy¹³.

The role of insulation

Retrofitting Europe’s buildings with stone wool could save 660 million tonnes of CO₂ – twice as much as France is currently emitting¹⁴. Thermal insulation has long been considered crucial for the future of energy consumption and meeting the greenhouse gas (GHG) emissions reduction objective, but most of Europe’s existing buildings stock has yet to improve insulating performance.

In 2018 alone, the ROCKWOOL Group created stone wool building insulation that can save up to 200 million tonnes of CO₂ throughout its lifetime¹⁵, which is the equivalent of more than 43 000 wind turbines running for a year¹⁶.



Buildings hold the largest climate action potential and within that energy efficiency is the cheapest path. Buildings are the ultimate climate solvers”.

Emma Stewart, Director, Urban Efficiency & Climate, World Resources Institute Ross Center for Sustainable Cities



Rejuvenating a community

In 2018, 50 years after they were built, the three 13-storey residential towers of Lion Farm Estate in Oldbury, UK, received a well-deserved renovation. The towers were built as affordable housing for more than 200 families but their physical condition had deteriorated and poor insulation generated high energy costs.

The contractor installed ROCKWOOL stone wool insulation and chose Rockpanel façade boards for the exterior walls. Together, they significantly improve the building’s thermal, sound and fire safety performance as well as its appearance, ensuring residents can feel safe and comfortable as well as proud of where they live.

“The use of ROCKWOOL and Rockpanel delivers a safe, low-maintenance solution and will mean an end to energy poverty for the Estate’s residents”.

Carl Yale, Regional Refurbishment Director of Lovell, primary project contractor



⁸ IEA, 2013, ‘Transition to Sustainable Buildings – strategies and opportunities to 2050’.

⁹ BPIE, 2011, ‘Europe’s buildings under the microscope’.

¹⁰ IEA, 2012, World Energy Outlook 2012.

¹¹ European Commission: <https://ec.europa.eu/clima/policies/strategies/2050>

¹² European Commission, 2018, ‘In-Depth Analysis In Support Of The Commission Communication Com(2018) 773’.

¹³ Calculations conducted by Material Economics, 2018 based on: BPIE, 2011, ‘Europe’s buildings under the microscope’;

European Commission, Joint Research Centre: EDGAR – Emissions Database for Global Atmospheric Research.

¹⁴ Calculations conducted by Material Economics, 2018 based on: BPIE, 2011, ‘Europe’s buildings under the microscope’; European Commission, Joint Research Centre: EDGAR – Emissions Database for Global Atmospheric Research.

¹⁵ Energy and carbon emission savings in the lifetime of our old building insulation and technical insulation products is calculated by ROCKWOOL, endorsed and following methodologies developed by Navigant.

See www.rockwoolgroup.com/carbon-impact

¹⁶ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Supporting better air quality

Renovation also delivers other surprising and life-enhancing benefits for communities. In areas where there is energy poverty, people may need to burn low-quality fuel or waste to heat their homes. Renovating buildings to reduce the energy demand for heating can help alleviate both energy poverty and air pollution.



ROCKWOOL building insulation can through its lifetime avoid particulate matter (PM) emissions that are equal to **taking more than**

50 million
cars off the road¹⁷.

Beyond buildings

It's not just buildings that can help combat climate change. Industry also has significant cost-saving and efficiency potential. Almost any industrial activity typically carries untapped efficiency savings. Protecting and insulating components such as pipes, appliances, vessels, boilers and turbines can deliver large efficiency gains.

¹⁷ Annual avoided air emissions from heating energy production as a result of our sold building insulation. Calculation method available at www.rockwoolgroup.com/carbon-impact Car emission calculation based on data from Bureau of Transportation Statistics from U.S. Department of Transportation and European Commission – DG Climate Action, 2015, 'Improvements to the definition of lifetime mileage of light duty vehicles'.

¹⁸ IPCC 'Climate change 2007 – Mitigation of climate change'.



Growing sustainable energy networks

Dutch port owner Groningen Seaports is developing a local network of steam pipelines to capture heat from nearby manufacturers and use it as sustainable energy for businesses. A bio steam pipe has been constructed in an industrial park.

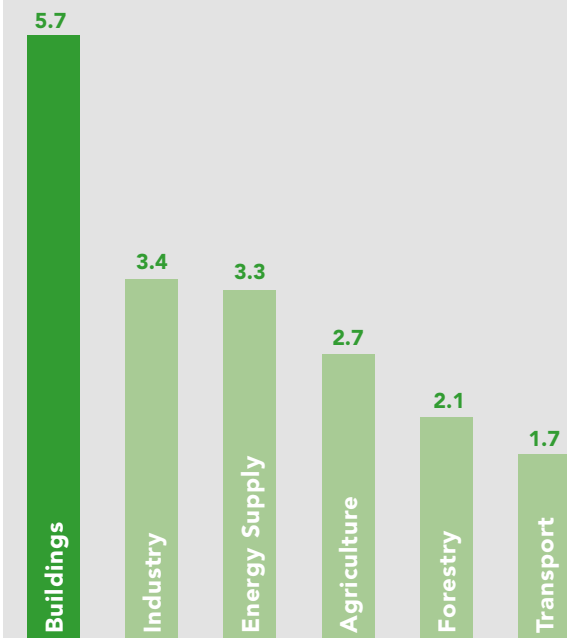
The steam flows through an above-ground pipeline for 2.7 km, so retaining heat with minimal loss is essential. ROCKWOOL's technical insulation around the pipes was chosen for its efficiency. The steam enters the pipeline at a temperature of around 300°C and arrives at the destination with only a few degrees of temperature loss.



Groningen Seaports, The Netherlands

The affordable solution

For the same amount of money, buildings can save almost 70% more carbon emissions than the next most cost-effective sector¹⁸.



GtCO₂e/year at carbon price <50 USD/tCO₂e in 2030

Multiple benefits of renovation

Renovating can also alleviate energy poverty and the associated health impacts from living in low-quality buildings. Energy poverty means people cannot afford energy to keep their homes properly heated. This degrades the indoor environment, which contributes to health issues from damp and mould.

Energy poverty means 30% greater risk of admission to hospital or primary care facilities for infants.

30–50% of excess winter mortality is attributed to housing conditions.

An estimated 15% of people in developed countries live in energy poverty.

19

Energy poverty can affect mental wellbeing and social contact.

Energy poverty affects children's diet if households reduce spending on food to afford fuel to keep warm.



Milan, Italy



Around the world, C40 cities are taking bold climate action, leading the way towards a healthier and more sustainable future. The main value of the C40 building retrofit project is that it will enable cities to efficiently and effectively measure the multiple benefits of retrofitting buildings. Evidencing the wider benefits of buildings retrofit is crucial to unlock action and drive change".

Piero Pelizzaro, Chief Resilience Officer, City of Milan

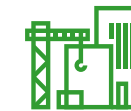
City collaboration for climate

Cities, along with national governments, are key players in leading the transformation of the building stock.

C40
CITIES
CLIMATE LEADERSHIP GROUP

In 2018, ROCKWOOL started collaborating with C40, a network of the world's largest cities representing one-quarter of the global economy and committed to addressing climate change. By the end of 2020, every C40 member city will have developed and begun implementing a comprehensive, measurable climate action plan to deliver low-carbon resilient development that is consistent with the ambitions of the Paris Agreement.

Our partnership provides the analysis and knowledge to implement renovation at scale. Through our work with C40, ROCKWOOL is part of a global partnership supporting workable solutions for climate action.



Up to 97%
of Europe's building stock needs renovation.

¹⁹ 'Putting renovation on the agenda – Global perspectives on the value of renovation', ROCKWOOL Group in collaboration with Copenhagen Economics, 2018.

Protecting people with stone

The effects of climate change are being felt in cities around the world, with many urban centres experiencing increasingly heavy rainfall. Stone wool's remarkable properties also help cities improve their resilience to flooding.



70% of cities are already dealing with the effects of climate change²⁰.

Stone wool can be engineered to absorb or repel water, depending on what's needed. Once excess water has been quickly drained from hard surfaces like roads and roofs, it can be collected in underground buffers of stone wool. The water is rapidly absorbed before slowly being let out into the surrounding soil, mimicking natural absorption processes.

Our Lapinus business unit has harnessed these characteristics to develop an innovative water management system called Rockflow. The Rockflow system can absorb 95 percent of its volume in water – in other words, a cubic metre of Rockflow can absorb 950 litres in 10 minutes. This is the first product of its kind and is part of ROCKWOOL's embedded culture of innovation and our commitment to use the exceptional properties of stone to protect people.



Driving cost-effective climate solutions

When the borough of Maasbracht, The Netherlands, needed a new sewer system capable of handling an extreme rain event, a custom-designed option was deemed too expensive.

To help manage the impacts of flooding, the municipality chose Rockflow, our water management solution that's built to stand the test of time and manage the effects of excessive rainfall.

Now when it rains in Maasbracht, the rainwater is diverted away from the wastewater sewer into a Rockflow rainwater buffer that runs underneath all 2.5 km of the borough's streets. Rockflow absorbs the rainwater quickly and releases it slowly into the surrounding soil over a period of 24 hours, all without disrupting life and activity on the roads above.

The result is a solution that takes peak pressure off the Maasbracht municipal sewer system and prevents damage to local infrastructure. By minimising flooding runoff, it also helps to keep local water supply systems clean, allowing the borough to protect this valuable resource.



Rockflow under the streets, Maasbracht, The Netherlands

²⁰ C40, 2012, 'Ending climate change begins in the city'.

Minimising our operational climate impact

Manufacturing any product requires using resources – particularly in our case, that means energy. And that means carbon emissions as well.

We are confident that our products are some of the most powerful solutions to global environmental challenges. But we want our solutions to leave the smallest negative footprint possible, which is why we continuously work to improve the sustainability of our operations.

In 2016, we set six ambitious Group sustainability goals to drive substantial improvements in our environmental and safety performance by 2030. One of these goals is to reduce the CO₂ intensity of our manufacturing facilities. We will drive this among others through an increased focus on energy efficiency. We've relaxed our standard internal payback timeframe on sustainability-related investments to ensure we give this work the resources it needs.

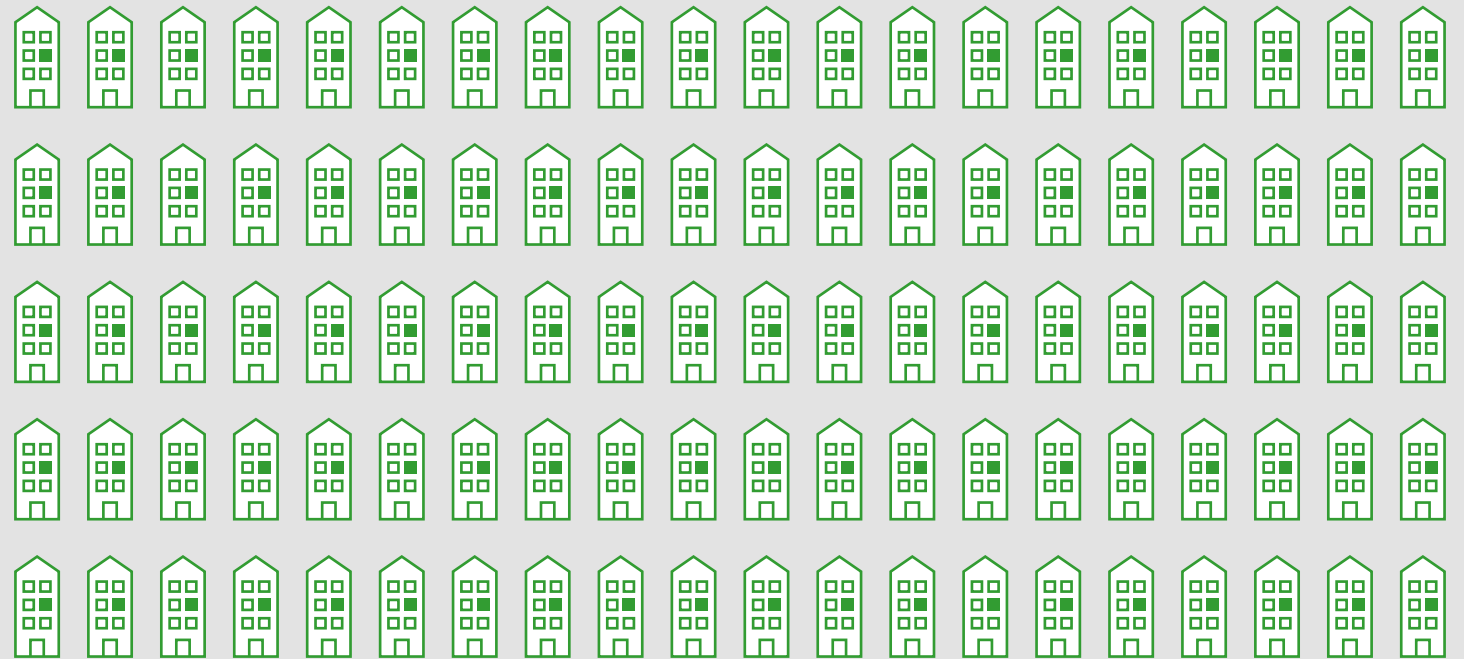
A small footprint with a big impact

Over their lifetime, our insulation products save far more energy and carbon emissions than we use and generate to make them, delivering a comprehensive climate solution.

We also want to show leadership and set the standard in the field of energy-efficient buildings. That is why we have an ambitious goal to improve energy efficiency in the Group's non-renovated office building stock and to build new offices with ultra-low energy demand.

Building insulation: Avoided carbon emissions

CO₂ emissions saved during product lifetime of building insulation
= **100 times** the emissions in production²¹.

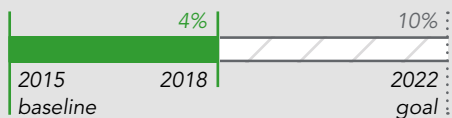


Progress on our sustainability goals

★ CO₂ emissions

SDG
13

Our goal: Reduce CO₂ emission intensity (CO₂/t stone wool) from our stone wool production facilities by 10 percent by 2022



Achieving less CO₂-intensive operations:

During 2018, we made good progress towards our 2022 CO₂ goal by reducing the carbon intensity of our factories by four percent compared with 2015. We continued the rollout of a live, energy-monitoring tool for our production. The tool – named NRG – helps the production facilities to assess energy efficiency by highlighting potential areas of improvement for the operators, process engineers and for management. NRG is now in operation in five facilities and is due to be introduced in nine more in 2019.

Part of our decarbonisation commitment is to use, where feasible, less carbon-intensive fuels in our production facilities. This is why in 2018 we announced that our facility in Moss, Norway will be converted to an electrical melter powered by energy from renewable sources.

★ Energy efficiency

SDG
7

Our goal: Reduce energy consumption (kWh/m²) within own (non-renovated) offices by 35 percent by 2022



Reducing energy need: We haven't seen the needle move yet on our office building energy efficiency goal since it was set in 2016. However, in 2018, four deep renovation investments were approved. These will get us close to a third of the way towards our 2022 goal. We are currently carrying out deep renovation assessments on a number of other buildings to ensure we reach our goal.

During 2018 we developed a specific Group policy for energy efficiency in new office buildings: the policy states that all new office buildings shall be constructed using passive measures to achieve ultra-low energy demand.



Revolutionising the way buildings are built with Rockzero

When we decided to construct a new innovation laboratory at our Headquarters in Hedeheusene, Denmark, we put our values – and our products – into action. Constructed using a Rockpanel façade, Rockzero walls, Rockfon acoustic ceilings and, of course, ROCKWOOL building insulation, the new laboratory is all about demonstrating ultra-low energy-efficient building technology. The new laboratory will have an energy consumption of only 25 kWh/m².

In 2018 we launched Rockzero – a pioneering new wall system that integrates the natural benefits of stone wool insulation with the structural support of the home or building.

With **Rockzero**, you can construct homes and low-rise buildings with ultra-low energy consumption, fire protection and indoor comfort. So not only does it deliver on energy performance, but it's also airtight, yet breathable.



Rockzero walls at ROCKWOOL's new innovation laboratory, Denmark

circularity built-in

Our pioneering solutions don't just make homes more efficient and resilient – they help cut waste and grow the circular economy, too.

Circularity built-in.



Future proofing growth

The world has experienced unprecedented growth in recent decades, lifting millions of people out of poverty. However, as the UN reports¹, this has also put incredible pressure on resources and accelerated the rate of environmental damage globally.

ROCKWOOL applies lifecycle thinking and the circular economy business approach to our value chain to help reduce some of the environmental impacts of growth. We use an abundant material² and engineer it to perform consistently for decades.

Our solutions enhance the sustainability of the societies that use them, offering environmental information on the whole lifecycle to make it simpler to construct more sustainable buildings.

We also make stone wool for precision growing in greenhouses, so that growers can produce more food with less water and fertiliser and using much less space.

Our production processes are guided by ambitious goals to minimise our negative impacts. We are currently tracking our progress against 2022 and 2030 goals to cut the waste we send to landfill, reduce our water use and lower our energy and carbon intensity. We also have a goal to increase the number of recycling services that take back our own products, and more programmes are being added each year. We also recycle other industries' waste by using it as a substitute for virgin raw material, diverting waste streams that would otherwise end up in landfill.

We believe that it's possible to expand our business and communities without harming

the environment – and we're working to ensure **ROCKWOOL helps society to grow sustainably.**

How we're supporting the UN SDGs



SDG 2 – Products:

Precision growing solutions enabling more sustainable food production.



SDG 6 – Products:

Precision growing solutions enhancing water efficiency in horticulture.

Operations:

Improving water efficiency in our own production facilities.



SDG 12 – Products: Increasing the number of countries offering product recycling services.

Operations:

Reducing landfill waste from production.



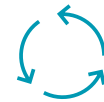
SDG 17 – Products:

Engaging in effective collaboration within key business areas across sectors and geographies.



130 000

tonnes of stone wool were collected for recycling.



10

countries with a ROCKWOOL recycling service offered to customers.



94

million litres of water saved by Grodan products.

In this chapter

- 18 Solutions for a circular society
- 20 Taking a lifecycle approach to buildings
- 21 Regenerating food supplies
- 22 Towards a smaller footprint



Stone wool recycling, Denmark

¹ United Nations Environment Assembly (UNEA) Regional Assessments [Announcement](#), 2016.

² TW Dahl, et al. 2011, International Geology Review (Volume 53 Numbers 7–8, June–July 2011) 'The human impact on natural rock reserves using basalt, anorthosite, and carbonates as raw materials in insulation products'.

Solutions for a circular society

In a circular economy, waste is not waste, but a valuable resource that can be regenerated or repurposed and turned into something new. Circular business approaches design out waste and keep products and materials in use, driving greater resource efficiency and cutting down on virgin materials. This helps to reduce the environmental impacts of production and enables our cities and societies to grow sustainably.

Responsible from start to finish – and start again

ROCKWOOL has a goal to offer recycling services for our products in 30 countries by 2030. We are also tracking our performance against an interim goal to have product recycling services in 15 countries by 2022.

This year we have taken a big step forward, as we have deployed product recycling programmes in five additional countries, bringing the total number of countries with a product recycling service programme to 10. ROCKWOOL also ensured that approximately 130000 tonnes of stone wool from the market were collected for recycling in our existing product recycling services, including from both the construction and horticultural sectors.

As well as recycling our own waste from production, we upcycle secondary materials from other industries. In 2018, our stone wool products had a recycled content of up to 50 percent, excluding closed-loop recycling of waste generated in the factory.

Keeping improvement accountable

In 2018, ROCKWOOL partnered with Circle Economy to analyse gaps in our value chain and to identify more opportunities for circular economy thinking. Thanks to this partnership, we have identified ways to strengthen ROCKWOOL's business model.



At Circle Economy, we are delighted to welcome ROCKWOOL as a Member and further deepen our collaboration by connecting them with other frontrunners in the circular economy. This formula for radical collaboration is an effective and proven route to inspire scalable action in the built environment and beyond".

Harald Friedl, CEO, Circle Economy

What makes our products circular?



ROCKWOOL recycling services will collect your used products to recycle



Stone is one of Earth's most abundant raw materials



Easily disassembled and separated

Made from up to 50% recycled material



Fully recyclable



Long lifespan of more than 60 years

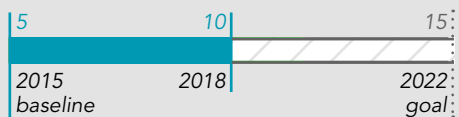
Progress on our sustainability goals

★ Reclaimed waste

SDG

12

Our goal: Increase the number of countries where we offer recycling services for our products to 15 countries by 2022



Our recycling service: After a successful pilot period, we established new product recycling services in Norway and Sweden. We partner with Ragn-Sells, which collects the wool coming from building sites, compresses it and delivers it to ROCKWOOL's production facilities.

In the United States and Canada, we introduced a service for a limited number of customers. Our product recycling services collect the cut-off materials from these customers, ensuring they are brought back to us to be incorporated into new ROCKWOOL products.

This year we also expanded the product recycling service in France, particularly for large façade projects (on a case-by-case basis).

Collaborative solutions

Collaboration is key for a robust and effective recycling infrastructure. We depend heavily on finding strong partners in the building sector value chain. This enables us to develop specific solutions, including combining take-back with product delivery to building sites and promoting the benefits of our service as part of sustainability building rating schemes.

However, collaboration can do only so much. We face several barriers in implementing these programmes, such as long transport distances and low landfill prices for mixed building waste. Such barriers can be difficult for individual producers like ourselves to overcome. For recycling infrastructure to develop in both scale and effectiveness, more supportive regulation needs to be put in place.

Countries with product recycling services

Existing:

Belgium

Denmark

Germany

Luxembourg

The Netherlands

New in 2018:

Canada

France (*expansion*)

Norway

Sweden

United States



Constructing a better future for Skanska

Multinational construction company Skanska aims to build for a better society. They are one of the customers using ROCKWOOL's new recycling service in Sweden in the project Solna United in Stockholm. Solna United is an office building aiming for LEED Platinum rating. The project requires a maximum of two percent of all waste going to landfill.

"When we found out that ROCKWOOL offers a recycling service, it created new opportunities to reach the target. Stone wool is a circular material that can be recycled and this contributes positively to Skanska's own sustainability goal to avoid construction waste going to landfill".

Bertil Rosquist, Green Business Development at Skanska



Stockholm, Sweden

Taking a lifecycle approach to buildings

In order to design and build sustainable buildings, we need to take a holistic approach across the lifecycle or we risk sub-optimising in the long run. Builders and architects depend on accurate information about how products are made and how they will perform so they can make the right choices in their designs.

To support sustainable choices, we provide Environmental Product Declarations (EPDs) in more than 20 markets for many of our products. The EPDs clearly summarise the product's lifecycle environmental impacts from extracting the raw materials and the process of manufacturing, right through to the end of their life and their recycling. These EPDs help builders and architects to achieve higher ratings in sustainable building rating schemes such as LEED, HQE, DGNB and BREEAM, empowering people to build more sustainably.

Innovation for better buildings

Digitalisation plays an increasingly important role across the construction sector value chain. We're developing sophisticated building information modelling (BIM) data capabilities that contribute to less wasteful construction and more cost-effective and sustainable operations, maintenance and eventual deconstruction of buildings. Working together with architects, contractors, software developers, standardisation bodies and other stakeholders, we're promoting more comprehensive outlooks and sustainability in BIM.

In addition, we are continuously developing our products to add even more built-in sustainability. Our innovative bio-binders, which have no added formaldehyde, are a good example.

Together, these solutions form part of ROCKWOOL's response to the growing trend for sustainable buildings.



Enabling sustainable buildings globally



Marina One, Singapore

Singapore's dramatic skyline has become synonymous with progressive, modern design – and it's a skyline that the [Marina One](#) development deserves to join. Marina One comprises four high-rise buildings: two office towers that are occupied by blue-chip tenants including Facebook and PwC; and two residential towers providing city apartments for around 3000 residents.

Architect Christoph Ingenhoven used ROCKWOOL building insulation and this choice of material helped Marina One become **Green Mark Platinum** and **LEED Platinum**.



World Cup stadiums, Russia

The FIFA World Cup in the summer of 2018 was one of the main events of the year. Did you know that all 12 of the new or renovated World Cup stadiums in Russia meet international sustainability standards, like **BREEAM Bespoke**? And that all stadiums have ROCKWOOL insulation built-in?

Since our products in Russia carry the EcoMaterial Absolute label; are included in the GreenBook of eco-safe construction materials; and come with detailed EPDs, there were additional points to be gained in sustainable building schemes. That was a strong factor in the decision to include our products in the FIFA 2018 stadium projects³.



Middelfart City Hall, Denmark

The city hall in Middelfart, Denmark, designed by the renowned Henning Larsen Architects, is the first building in Denmark to become **DGNB Platinum + Diamond** certified. The outstanding thermal and fire resistance properties of ROCKWOOL insulation were key in achieving the highest sustainability certification.



Intelligent Quarters, Germany

In Hamburg, a different ROCKWOOL solution met the needs of [Intelligent Quarters](#), a 70-metre office tower.

The building height called for approximately one kilometre of fire barriers to be installed. ROCKWOOL building insulation products helped Intelligent Quarters meet the requirements for a German Sustainable Building Council (**DGNB**) certificate.

Regenerating food supplies

As our populations and cities grow, our food needs increase, too. The United Nations estimates that by 2050, there will be 9.7 billion people on Earth, two billion more than today⁴. This means that as early as 2030, global food demand is set to rise by 35 percent⁵ and may double by 2050⁶.

Through our Grodan brand, ROCKWOOL supports sustainable hydroponic horticulture, which allows plants to be grown without soil, while using less water, fertiliser and land. Stone wool is the most widely used medium in hydroponics as it gives the optimal conditions for root growth and plant health.

During the year, Grodan products enabled a saving of an estimated 94 million litres of water⁷. That would be enough water to grow a year's worth of coffee for almost 137 million Americans⁸.

Grodan products also saved nearly 26000 hectares of land, an area almost three times the size of Paris⁹.

More than 90 percent of Grodan customers in Europe have access to recycling solutions, and we are continuously working to extend the availability of recycling solutions for non-European customers.

We are highly dependent on strong collaboration in our value chain to maximise the environmental benefits of recycling. In 2018, we released our first recycling manuals for growers to advise them how to recycle used Grodan substrate. In 2019, we will release a manual for recyclers. The manuals will be continuously updated with market information and insights.



Grodan: growing more with less

NG2.0 is Grodan's latest growing media technology to enable growers to produce more with even less water, nutrients and land.

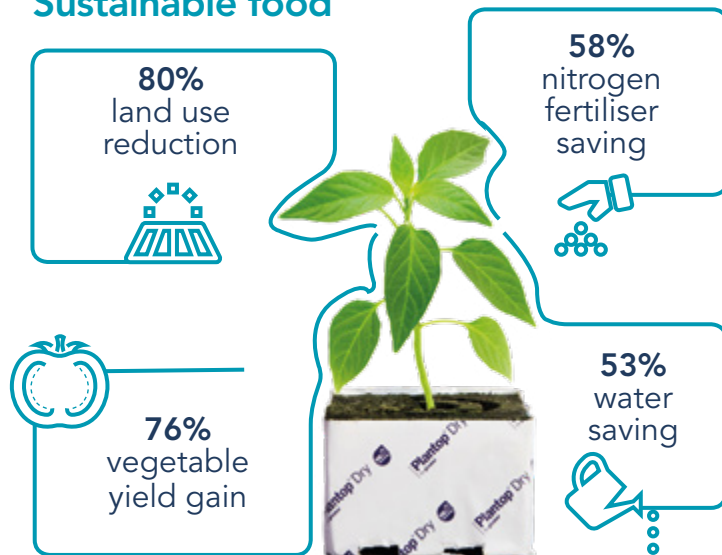
The benefits of NG2.0 include more uniform water distribution, ensuring the crop makes more efficient use of the whole substrate volume. This promotes continuous growth of new roots in both the block and the slab for a healthy and vigorous crop throughout the season. That means higher yields, improved

quality and reduced sensitivity to diseases. NG2.0 crops have also been shown to use up to 15 percent less water than the previous generation solution from Grodan.

"With NG2.0 both the horizontal as well as the vertical water distribution efficiently nourishes the plant, making better use of the entire substrate volume".

Rob Moors, Kwekerij Moors, vegetable wholesaler, The Netherlands

Sustainable food



The calculation methodology is available at www.rockwoolgroup.com/precision-growing-impact



⁴ United Nations, 'World Population Prospects, 2015 Revision' and World Population Clock, <https://www.census.gov/popclock>

⁵ <https://farmingfirst.org/Post2015-Food#2>

⁶ FAO, IFAD, UNICEF, WFP and WHO, 2017, 'The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security'.

⁷ The calculation methodology is available at www.rockwoolgroup.com/precision-growing-impact

⁸ <http://www.e-importz.com/coffee-statistics.php>, assumptions: average kettle uses 1.7 litres of water, eight cups of coffee per kettle.

⁹ The calculation methodology is available at www.rockwoolgroup.com/precision-growing-impact

Towards a smaller footprint

We are committed to reducing the environmental footprint of our operations, and have set goals to, among others, reduce water intensity and waste to landfill. We have robust environmental management systems in place in all our manufacturing facilities. We conduct regular internal audits and are subject to external audits to continuously pinpoint areas for improvement. We also use state-of-the-art abatement technology when building new production facilities or retrofitting existing ones.

Managing waste

Utilising proprietary ROCKWOOL technology, we have developed ways to increase the circularity of our factories. Firstly, the fact that stone wool is 100 percent recyclable presents us with a significant opportunity to have fully closed-loop stone wool systems at all our factories. This means we can recycle waste wool generated during the production process and take back our products from construction and demolition sites. Secondly, we have developed ways to use waste from other industries. Thanks to these processes, we are confident we will fulfil our ambitious 2030 goal of 85 percent reduction in waste to landfill.

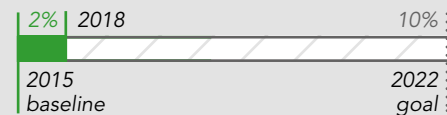
Progress on our sustainability goals

✓ Water consumption

SDG

6

Our goal: Reduce water intensity (m^3/t stone wool) within our factories



Saving water: In 2018, we improved our water efficiency by two percent, leading to a two percent accumulated saving compared with the 2015 baseline. These savings come from strengthened water management practices, together with technical improvements in our factories.

✓ Landfill waste

SDG

12

Our goal: Reduce landfill waste from our factories (tonnes)



Investing to reduce waste to landfill: Due mainly to increased sales of stone wool, the amounts of waste sent to landfill increased by 10 percent in 2018 alone and increased five percent when compared with the 2015 baseline. However, we remain on track to meet the 2022 goal of 40 percent reduction, due mainly to the impact of significant investments in new recycling plants in South Asia and Russia, together with a new electrical melter in Norway which will enable higher recycling rates.



ROCKWOOL and Flechtingen: a partnership in clean air

Achieving a healthy community takes the efforts of industry, government and local residents working together. In 1990, when we took over a facility in the town of Flechtingen, Germany, our priority was investing in new and innovative technologies to improve environmental conditions.

Tourism is a year-round industry in this region and one of the top drivers of economic development, and Flechtingen welcomes thousands of respiratory recovery patients and tourists annually.

The partnership between the town and industry including ROCKWOOL helped Flechtingen, located under a kilometre from our factory, achieve 'clean air resort' status.



Flechtingen, Germany



Up to **50%**
recycled content of
our products.

Protecting local water systems

Our production process is designed for zero waste water discharge to the environment. No production process waste water is discharged into waterways or the ground at any of ROCKWOOL's manufacturing facilities. In 2018, four percent of our water use came from rainwater harvesting. There are plans in place to increase this percentage in the coming years.

We continue to monitor closely and drive improvements in the four factories in the Group that are deemed to be located in highly or extremely highly water-stressed areas¹⁰. In 2018, significant improvements were achieved in water efficiency in two of these factories, in Russia and India, whereas water intensity increased in both factories in Malaysia. This negative trend is now being addressed.

Being a good neighbour

As a part of our production process, we generate air emissions. Our production facilities are subject to strict air quality regulations that are in place to protect sensitive groups of the population, animals and the environment. Many of our factories are located close to residential neighbourhoods, schools, businesses, parks and protected greenspaces, and we have successfully operated in these neighbourhoods for decades. This is the case, for example, at Flechtingen in Germany, where we have been located for more than two decades and worked with the town to achieve a clean air resort status.

In 2018, ROCKWOOL experienced local opposition to its new production facility in West Virginia, United States. Many of the residents'

concerns related to the impact of the factory on local air quality. We are actively working with the community to allay their concerns. For example, we've made a commitment to both independent, third-party monitoring and publicising air quality data around the production facility. We will cover the costs of installing monitors and will also pay for the third-party operators to manage them. We are confident that the measurements will confirm that there will be no deterioration in the local air quality.



Making the case for low carbon in Canada

Our facility in Milton, Ontario, served as the backdrop for Canada's Minister of Environment and Climate Change Catherine McKenna to announce funding to support Canada's low-carbon future.

During her visit, the Minister learned more about our commitment to responsible citizenship through our products, operations, programmes and policies. We demonstrated processes for upcycling, recycling, heat recovery, water conservation, energy efficiency and more; and then discussed how others could apply ROCKWOOL's model to support a more circular and resource-efficient economy.

It's encouraging to see our work gaining attention from policy-makers because that's how we can scale our results to businesses everywhere.



Milton, Ontario

¹⁰ Water scarcity assessment conducted for ROCKWOOL by Ramboll Environ in 2017.

safe and sound built-in.



Comfortable and safe spaces support healthy human development. That's why thriving societies need safe, quiet places to live, work, learn and recover. The superior solutions from ROCKWOOL support people and progress by delivering fire safety, sound management and empowering environments.

Safe and sound built-in.

Safer, healthier societies

Due to rapid urbanisation and people spending more time in front of screens, much of our lives take place inside. It is vital that the buildings where we live, work, study and heal keep us safe and enhance our wellbeing.

ROCKWOOL's products do both. Our non-combustible insulation and cladding help to stop the spread of fire in buildings, and our Rockfon tiles optimise acoustics to help children to learn, employees to focus and patients to heal. Alongside our products, we also partner and engage with multiple stakeholder groups worldwide to advocate for stronger fire safety regulations for buildings.

Our mission to protect wellbeing starts with our 11 600 employees. We apply leading safety and occupational health management to our facilities to keep our colleagues safe. We also actively promote diversity and inclusiveness for our global workforce, and continuously seek to avoid discrimination and provide equal opportunities for all.

And as a company with manufacturing facilities, we know that our ability to operate depends on the benefits we bring to communities – for example, through taxes and job creation – and society globally. In addition, we seek to provide these benefits through the impacts of our products, our responsible supply chain management, our work against corruption and in the other ways we operate a responsible business.

How we're supporting the UN SDGs



SDG 3 – Products:

Reducing noise and creating acoustically sound buildings for improved health and wellbeing.



SDG 8 – Products:

Providing local jobs and economic growth.

Operations:

Zero fatalities and reducing Lost Time Incidents.



SDG 9 – Products:

Enabling more durable and fire-resilient infrastructure.



SDG 17 – Products:

Engaging in effective collaboration within key business areas across sectors and geographies.



Fire safety advocacy post-Grenfell contributes to the UK ban on combustible façade insulation and cladding.



Improved acoustic learning conditions for over **300 000** students.



3.1 Lost Time Incident rate at our production facilities in 2018*.

In this chapter

- 26 Enabling safe spaces
- 28 Enhancing acoustic performance
- 30 Doing more for the people behind our products
- 32 Helping communities thrive



*Lost Time Incident (LTI) rate: total Lost Time Incidents per 1 million working hours.

Enabling safe spaces

The right to protection

We spend most of our lives indoors – with friends, family and colleagues, and on our own. It's every person's right to feel safe when they're inside. But as events like London's 2017 Grenfell Tower tragedy show, safety isn't always assured. Years of lax oversight and loosening standards meant regulations failed the people they were designed to protect.

Supporting robust regulation

ROCKWOOL has long advocated for greater fire safety and we support our convictions with products that provide the protection people deserve. Fires are developing 5–10 times faster today than in the 1950s¹. The safety of building occupants and first responders depends, among other things, on delaying the release of toxic smoke, which causes more than half of building fire casualties in the UK².

Stone wool's built-in fire protection is not dependent on flame retardants and curbs toxic emissions. We believe these life-saving attributes should be the minimum when it comes to building design. We have always advocated this and supported public debates with facts and expertise.

Achieving change

During 2018, media focus on Grenfell helped drive real progress, and ROCKWOOL supplied facts and expertise including making submissions to the public consultations and the Hackitt review. In June, our Senior Vice-President, Mirella Vitale, testified in Westminster for the Independent Review of Building Regulations and Fire Safety.

The results are encouraging. The UK government has now banned combustible insulation and cladding from the facades of residential buildings, hospitals, care homes, residential schools and student accommodation above 18 metres. The ban applies to all new buildings and when there are refurbishments with material alterations to the building.

But there's still more to do. We strongly advocate to extend the ban to all high-risk buildings, regardless of height, including hospitals, schools, sheltered housing and hotels.

Strengthening our industry

We are starting to see important changes in the construction industry. Not only are robust fire safety measures increasingly being taken into consideration, but we're also seeing a growing demand for fire safe products.

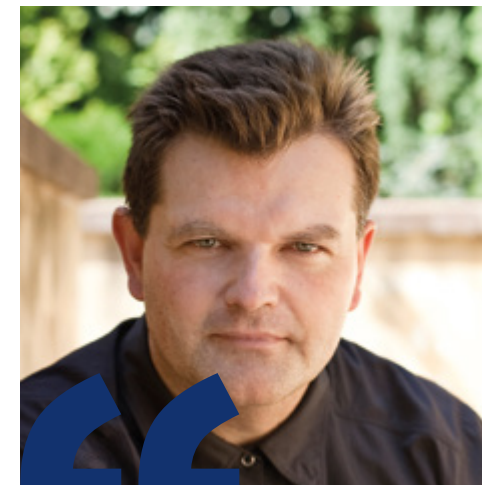
Collaborating for fire safety

This year we shared insight with the European Commission on the Energy Performance of Buildings Directive about including fire safety during renovations, and advocated for an alternative European approach to assess the fire performance of facades.

In North America, we collaborate with the National Fire Protection Association and ASTM International. We are a President's Council member of the National Association of State Fire Marshals, and work with Fire Safe North America and the International Firestop Council. These networks advance fire safety provisions in building code development processes and are contributing to the development of a new façade fire test standard for apartment buildings that have historically been unregulated.



Our insulation withstands temperatures greater than **1 000°C** and can help prevent fire from spreading.



Events like Grenfell in London shook our profession to the core and are a call to arms that the safety and wellbeing of a building's inhabitants are one of our primary responsibilities as architects. As cities grow and become ever denser fire safety should play a fundamental role in any design as we create environments where people will work, learn, play and live in the future".

Kai-Uwe Bergmann, Partner, BIG NYC

¹ UL, 2012, 'Analysis of Changing Residential Fire Dynamics and Its Implications on Firefighter Operational Timeframes'.

² Department for Communities and Local Government. Fire Statistics: Great Britain, April 2013 to March 2014. January 2015.

Sharing know-how

Fire safety is not just about regulation – it's about awareness and hands-on experience, too. Educating builders, building owners, specifiers and architects is key to keeping citizens safe. We provide installation guides, host expert advice on our blogs and provide fire safety advice to the end users of our products. [Guidance](#) could be videos on how to properly install a fire barrier or [helpful tips](#) on how to improve fire safety in your own home.

To make safety even simpler for end users, we've gathered all our installation guides, safety instructions and much more on our website, giving consumers all the support they need when working with ROCKWOOL products.



Protection from every angle

[Baltyk Tower](#) is an eye-catching, 16-storey new building in Poznań, Poland that resembles a giant staircase. The 25 000 m² tower includes retail spaces, offices and a panorama restaurant.

Due to the building's height and unusual design, fire safety was a key challenge for Dutch architects MVRDV. The thermal performance and non-combustible properties of stone wool insulation from ROCKWOOL provided a simple, robust solution to help prevent the spread of fire.

It's easy to see why this dramatic new development has become a new landmark in Poznań. And thanks to the use of non-combustible stone wool, every user of the building can safely enjoy its impressive facilities, now and in the future.



Enhancing acoustic performance

A growing issue

The conversation around healthier buildings often focuses on light and air quality. But noise levels also significantly impact health and wellbeing. In 2018, the World Health Organization (WHO) updated its Environmental Noise Guidelines for the first time since 1999, stressing that noise has negative impacts on human health and is becoming a growing concern.

A recent survey on hospital acoustics found that 60 percent³ of patients surveyed complained of sleep disturbance due to noise. A research team in France found that for every 10-dB increase in noise pollution, 8- to 9-year-old students performed 5.5 points lower on their national standardised test⁴.

More significantly, approximately 16600 cases of premature death from noise exposure occur each year in Europe and the annual cost of European noise pollution is estimated to be EUR 40 billion⁵.

Impact is easy

But research shows improving indoor environmental quality results in substantial wellbeing benefits, including enhanced learning abilities for school children, better productivity in office workers and better recovery for patients.

For example, just improving acoustics in open-plan offices can increase concentration levels by 48 percent, decrease stress levels by 27 percent and reduce error rates by 10 percent⁶. There is up to a 12 percent increase in employee productivity

at a typical office, which on a European scale, could be worth up to EUR 500 billion annually⁷.

That's why ROCKWOOL supports including health and wellbeing benefits as criteria in how we evaluate, renovate and develop buildings – especially our homes, schools, offices and hospitals.



Collaborative, but quiet

When Canadian firm Aercoustics Engineering needed to transform a 836 m² former warehouse space into a modern, comfortable and attractive office, they wanted to make a design statement that improved office acoustics and showed their expertise in noise and vibration control.

They chose Rockfon panels for their superior sound absorption and sleek, clean design, which suited the office perfectly. Since the Rockfon panel range is made entirely from stone wool, it does not encourage mould or bacterial growth thereby improving indoor air quality in the office and contributes to a healthier working environment.

Aercoustics Engineering has created an aesthetically compelling and sound-absorbing space that matches its culture and demonstrates its technical expertise.



Mississauga, Canada

³ <https://www.aecom.com/without-limits/article/acoustic-design-health-environments>

⁴ Harvard, TH Chan, 2017, 'Foundation for Student Success'.

⁵ European Environment Agency, 2014, 'Noise in Europe 2014'.

⁶ Sykes, D, 2004, 'Productivity: How Acoustics Affect Workers' Performance in Open Areas'.

⁷ Buildings Performance Institute Europe, 2018, 'Building 4 People: Quantifying the benefits of energy renovation investments in schools, offices and hospitals'.



Improving acoustics in open-plan offices can increase concentration levels by

48%.

Building real benefits

During 2018, ROCKWOOL collaborated with Buildings 2030 on the Healthy Buildings report. This comprehensive report details the impact of improved indoor environmental quality on people's health and productivity, and is the first study to combine the impacts of the separate components of the indoor environment. Our aim is for this data to help drive meaningful, people-focused choices around building design and renovation.



The acoustic solutions Rockfon delivered to schools worldwide in 2018 improved the learning conditions of over

300 000 students.



The impact on learning conditions from acoustic products sold is calculated using methodology developed by Ramboll, who also validate the annual result. The methodology was first developed and applied for the 2018 results. See www.rockwoolgroup.com/acoustic-impact



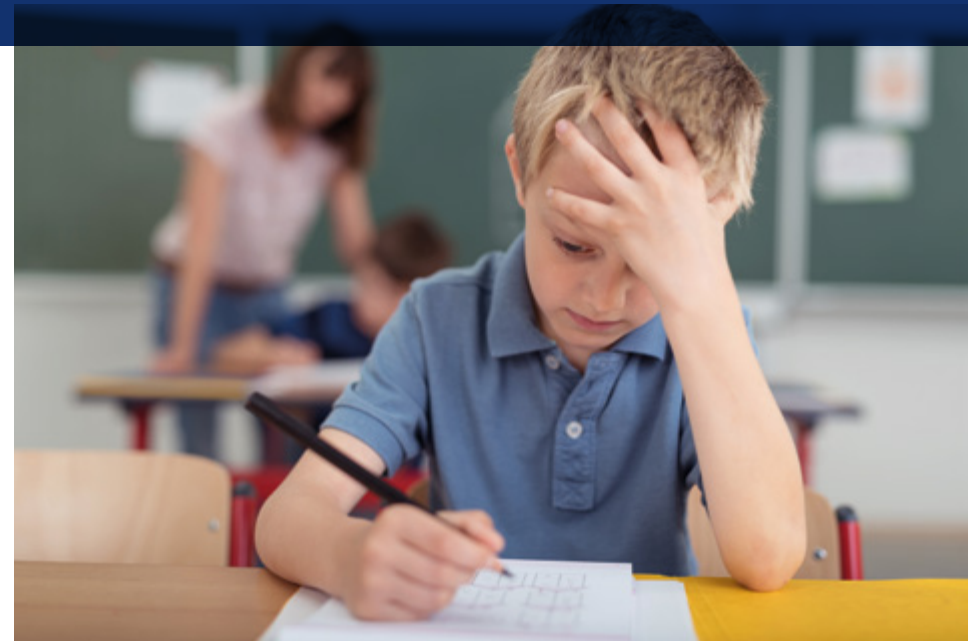
Classrooms supporting concentration

Caldicot School and Monmouth Comprehensive are brand-new schools in Wales that are equipped with state-of-the-art facilities. The schools feature spacious classrooms, theatre-style learning areas and studio spaces for informal study.

Rockfon acoustic products play a pivotal role by creating stimulating learning environments. Rockfon acoustic solutions are a tough, non-combustible and future-proof ceiling. Its high sound absorption helps improve speech intelligibility, significantly contributing to learning outcomes.

"We've worked with Rockfon before on several projects and can specify their products with confidence. They're aesthetically appropriate and there is an assurance of performance too, which is very important to us".

Tim Humphries, BDP Lead Architect on Caldicot School and Monmouth Comprehensive



Doing more for the people behind our products

Besides delivering solutions that protect our customers, ROCKWOOL is also committed to providing a safe, fair and engaging workplace for our employees.

We have developed a culture that puts the safety of colleagues first, promotes equal opportunities, supports diversity and acts against discrimination.

Engaging our global workforce

In order to promote and raise awareness of policies and procedures in a global, culturally diverse organisation, we focus on ensuring that both managers and employees have read and understood our Code of Conduct and that they act according to its values. This year, we supported this with additional e-learning for the Code. In addition, we maintain a robust whistle-blowing system, whereby all internal and external stakeholders can safely report misconduct or suspicion of misconduct.

In 2018, we rolled out RockWise – our first global digital learning platform. The cloud-based portal provides 24/7 access to educational resources and hosts mandatory training programmes that are easy to access and complete. One of many benefits is that it simplifies the process of onboarding new employees, making it easier for new hires to become familiar with ROCKWOOL's policies and culture.

Creating a more diverse industry

Our industry is traditionally a male-dominated one – something ROCKWOOL would like to help change. We have focused on increasing the number of women in different levels of management. The gender split across the Group has been relatively stable over the past few years with an 18/82 ratio of women to men, but the proportion of women is higher at executive and middle management levels.

In 2018, Group Management set a new 2020 target of 25–35 percent female leaders in executive and middle management positions.

At the end of 2018, 26 percent of the leaders in executive and middle management positions were women, the same as in 2017. One way we maintain the gender composition is ensuring a higher proportion of women among new line managers for middle management positions. In 2018, 39 percent of new hires were women compared with 28 percent in 2017.

To meet our diversity 2020 targets, we will continue to strengthen general diversity growth through our talent development processes and goal-aligned management appointments.



We employ

11 600

people in 39 countries
with 61 nationalities.



In 2018,

39%

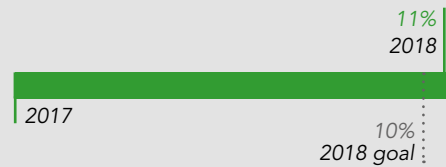
of new hires for middle
management positions
were women, compared
with 28 percent in 2017.



Progress on our sustainability goals

★ Safety, health and wellbeing SDG 8

Our goal: Reduce Lost Time Incident (LTI) frequency rate by 10% annually



Our goal: Ensure 0 fatalities annually

1 fatality 2018

Safety first: In July, we experienced a tragic, fatal accident at our production facility in Gladbeck, Germany – the first fatality in ROCKWOOL since 2012. A 24-year-old employee from the maintenance department passed away due to injuries sustained in a fall through a roof. Following the incident, we reinforced existing practices for how we work at heights in the Group. The lessons have been shared among all the production facilities. This accident has been a difficult reminder that constant vigilance and focus on safety culture is required every day.

In 2018, we reduced the Lost Time Incident (LTI) frequency rate by 11 percent, from 3.5 to 3.1, which means that we met our annual 10 percent reduction goal.

In the course of the year, we introduced a series of initiatives in our production facilities across the Group designed to reinforce our safety culture and heighten a collective sense of duty and awareness to pre-empt and avoid risk.

A year of promoting safety awareness

We strive to create safe and healthy environments and conditions for all employees and people working with us globally. As an industrial company, there is potentially a high level of safety risk for our employees and we take the management of that risk extremely seriously. We have a goal of zero fatalities for people working with and for us, and have an ambition to incrementally reduce the Lost Time Incident (LTI) rate by 10 percent every year.

Every year, ROCKWOOL organises Safety Day activities across our global operations. At our

various locations, we choose relevant topics and develop awareness campaigns to engage workers in activities and conversations that promote greater safety awareness.

Employees in North America chose to raise awareness of mental health and hosted a competition to encourage employees to share coping advice.

In Spain, colleagues participated in a charity run to create awareness of workplace safety and to raise money for people who have been injured in work accidents. In China, a ‘commitment tree’ was created that employees could add a leaf to share their commitment to safety.



ROCKWOOL's production facility in Croatia received an award for **outstanding safety performance**.

During the year, our ROCKWOOL production facility in Croatia was recognised with a safety award by the Croatian Office for Improving Occupational Safety for its outstanding results in reducing injuries, improving occupational safety and implementing good safety practices. During the campaign's two-year run, ROCKWOOL Adriatic had zero Lost Time Incidents.



Helping communities thrive

Around 90 percent of our business is local, meaning we produce close to our customers, and we hire from the communities where we operate.

For ROCKWOOL, building and operating a production facility is a long-term investment. We believe in supporting shared progress and nurturing open, lasting relationships with our neighbourhoods.

We focus on making a significant, positive and enduring economic impact in the communities that we are part of. We have a number of factories in the Group where we have been operating for decades.

In 2018, we witnessed a growing demand for fire safe insulation in the UK. In response, we've hired an additional 50 permanent production employees at ROCKWOOL's production facility in Bridgend, Wales. We will also be hiring 65 more employees in 2019, when a new logistics centre is built there.

We believe that tax practice is an important part of responsible corporate citizenship. We are committed to the principle of paying tax where value is created.

Around
90%
of our business
is local.



Proudly paying a Living Wage

In 2018, as part of Living Wage Week, ROCKWOOL made a voluntary commitment to provide the Living Wage* for all directly employed staff and third-party contractors at our operations in the United Kingdom.

Wales, where ROCKWOOL has its UK manufacturing facility, has one of the highest proportions of non-Living Wage jobs in the country, at 24 percent. As part of the commitment, we pay rates significantly higher than the government minimum for over 25s.

The Living Wage Campaign's hourly rates are recalculated annually in accordance with the actual cost of living, and ensure that workers are paid enough to have a decent standard of living.

"ROCKWOOL is extremely proud to be a Living Wage employer. We have paid employees above the minimum wage rates for many years and this accreditation demonstrates our commitment to paying the real Living Wage in the long term".

Darryl Matthews, Managing Director, UK



Growing communities

Scheduled to open in 2020, ROCKWOOL's new factory in West Virginia represents an approximately EUR 130 million investment designed to serve customers in the Mid-Atlantic region of the United States. The facility will employ approximately 150 people in well-paying positions, ranging from technicians to management, and all but a handful are expected to be hired locally. When production begins, an additional job is typically created for every position hired. This includes roles in technical services, trucking and the manufacturing of raw materials. Local government will benefit from a broader tax base to support publicly funded activities and priorities.

Building community resources

ROCKWOOL has been a part of Milton, Canada for decades and has always looked for ways to support the town. We continued to support the Milton District Hospital Foundation, the local community hospital, in 2018.

Our donation supported the expansion of the Prenatal Assessment Area of the Maternal Newborn Department.

Aside from the donation, ROCKWOOL stone wool insulation has also been integrated into the building. This has helped to make it an energy-efficient and cost-saving green building. It also delivers sound dampening for a calm, quiet environment for the patients and staff at the hospital.

*A Living Wage is the minimum income necessary for a worker to meet their basic needs.

Supporting shared progress

At its heart, ROCKWOOL is a family business founded on the idea of not just keeping communities safe but also helping people to flourish. Philanthropy and corporate citizenship have always been an integral part of our culture and we strongly believe in being good stewards. That's why, in 1981, six members of the Kähler family established the ROCKWOOL Foundation. The Foundation reflects the passion and values the Kähler family defined from the outset. As part of the Kählers' ongoing commitment to progress, the family remains an active member of the Foundation's Board to this day. The ROCKWOOL Foundation supports research and interventions that contribute to society's body of shared knowledge.

There are two primary objectives of the ROCKWOOL Foundation:

- to analyse and provide knowledge about society through reliable independent research; and
- to develop interventions that address societal challenges.



Helping children heal

We also partnered with the Hard Rock Heals Foundation to develop a music room at the children's hospital at La Paz University Hospital in Madrid, Spain, which uses music therapy to treat hundreds of patients per year. Our partnership resulted in a music space with instruments and a recording and rehearsal area where young patients can play music and recover. We donated Rockfon acoustic ceiling tiles to give the room an authentic music studio function and appearance.



In 2018,
23%
 of ROCKWOOL Group's dividend supported the ROCKWOOL Foundation's activities.



Madrid, Spain

ROCKWOOL

Sustainability factbook

This factbook contains facts on ROCKWOOL's sustainability priorities, including how we manage and govern issues such as stakeholder engagement, responsible business conduct, human rights and other compliance issues. The factbook also contains tables with key performance metrics.

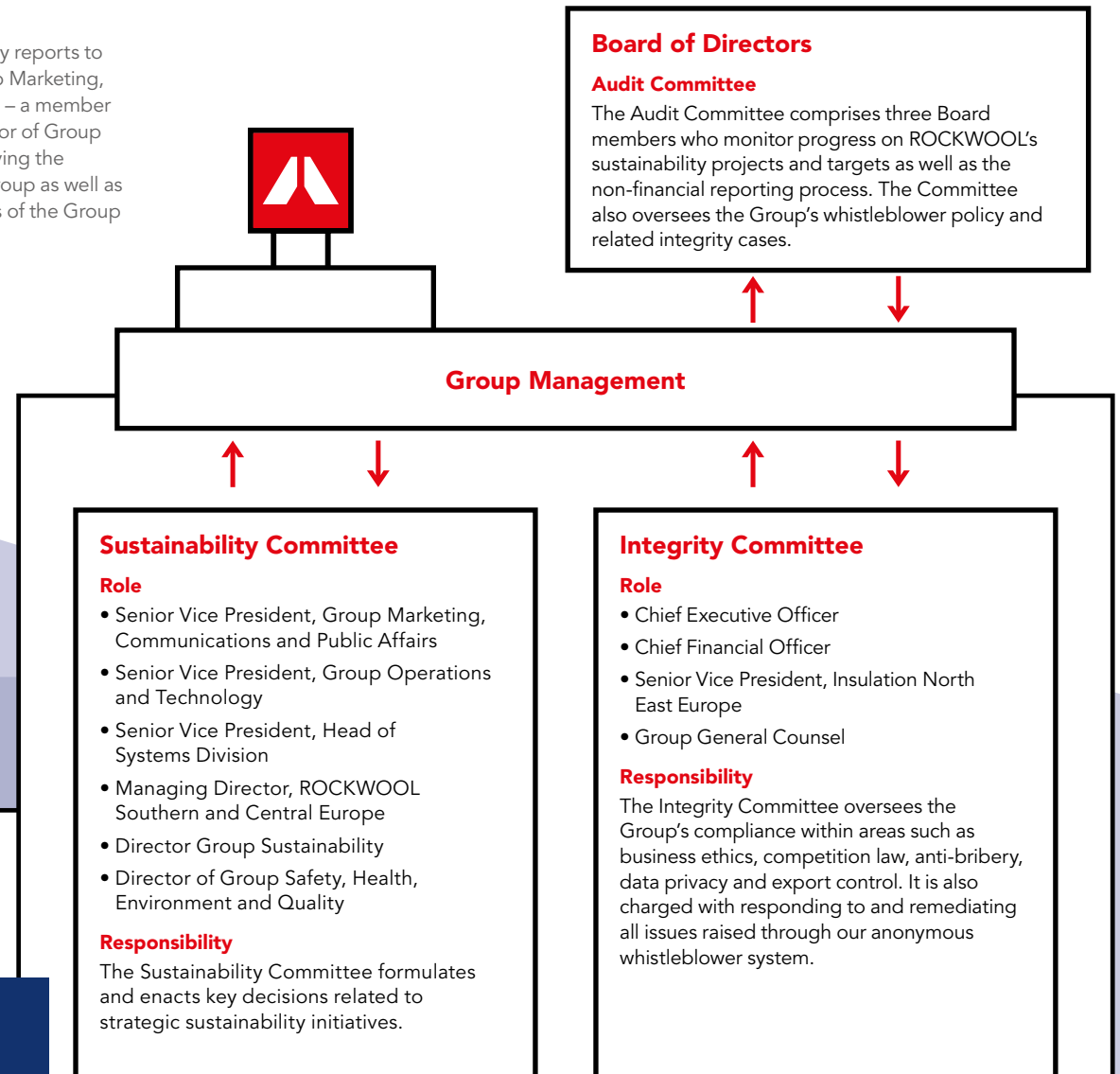
Managing sustainability

Sustainability at ROCKWOOL is embedded in every aspect of our business. It's as much a part of how we operate as our drive to innovate and create leading stone wool products. Our sustainability governance structures are aligned with the highest levels of our Company's management, ensuring that we have the resources and input to engage with our stakeholders and continuously improve our performance.

Sustainability governance

The Director of Group Sustainability reports to the Senior Vice President for Group Marketing, Communications and Public Affairs – a member of Group Management. The Director of Group Sustainability is responsible for driving the sustainability agenda across the Group as well as coordinating and tracking progress of the Group sustainability goals.

Governing our sustainability



Materiality

We determine ROCKWOOL's material issues annually through a number of internal and external processes.

Since 2015, we have used our strong strategic focus on the Sustainable Development Goals as our main process to identify and account for our **key social and environmental impacts**.

As part of our communication on progress (COP) to UN Global Compact, we also report on the management and performance of several environmental, social and governance issues that are considered material from a **compliance and transparency perspective**.

We also regularly engage with stakeholders across our value chain to understand the **stakeholder concerns and expectations** of us as a business. Many expectations faced by corporations are well established and have been formalised by law, including emission limits, tax schemes, safety requirements and minimum wages. However, as a corporation we also need to understand and meet informal, evolving and location-specific expectations to maintain our social licence to operate.

Communities today frequently become more aware and active when corporations engage in building on greenfield land or when they significantly expand their manufacturing facilities. We need to engage with local communities more extensively and earlier in the process than we have in the past.

Our material impacts

	Key social and environmental impacts on the SDGs	Compliance and transparency
Energy efficiency and carbon management	✓	✓
Circular economy	✓	✓
Fire resilience	✓	✓
Safety, health and wellbeing	✓	✓
Water efficiency and management	✓	✓
Public and private sector collaboration	✓	✓
Decent work and job creation	✓	✓
Anti-corruption and bribery		✓
Environmental management	✓	✓
Human rights		✓
Supply chain management		✓
Responsible tax		✓

Operating as an ethical business

Our [Code of Conduct](#) (the Code) is our key communication on and guidance for ROCKWOOL Group's way of working with integrity. The Code includes Group policies related to anti-corruption, gifts and hospitality, conflict of interest, competition law, data privacy, human rights and labour rights, health and safety, and the environment.

In 2018, to ensure the rigorous implementation of the Code, we made it an integral part of our annual internal organisation-wide audit and legal service reviews. At the end of 2018, we also launched an e-learning course of the Code, covering business ethics, anti-corruption and conflict of interest. Special emphasis is put on how and where to seek necessary guidance and how to report concerns. The course has a target group of approximately 6 000 employees.

Zero tolerance for corruption

ROCKWOOL Group has zero tolerance towards any kind of fraud, corruption, bribery and facilitation payments and we maintain an anti-corruption policy that also applies to suppliers, agents and other third parties.

In 2018, the Group adopted a new policy and manual that covers the appropriate use of gifts and hospitality and the required approval levels. The policy is aligned with the U.S. Foreign Corrupt Practices Act and the UK Bribery Act. As a part of the policy, ROCKWOOL Group employees are no longer allowed to receive gifts from business partners.

Using Transparency International's annual country risk assessment for bribery and corruption, we provided training to staff in anti-corruption and bribery in four countries in 2018. The training, conducted by the Group Legal department, was done in the local language and was directed at staff with contacts to third parties such as sales, marketing, procurement, operations, HR and finance.

During 2018, we received a total of 15 integrity cases. This is an increase of three cases compared to 2017. The reported cases involved fraud, conflict of interest, breach of legislation, bribery, working conditions and other issues. The majority of cases were reported directly by employees to management or through the whistleblower system. All reported cases resulted in investigations. Out of the 15 investigated cases, 10 resulted in ROCKWOOL initiating corrective actions.

ROCKWOOL's approach to agents

ROCKWOOL Group only uses agents where it makes more commercial and financial sense than establishing our own marketing and sales presence. Before appointing an agent, we conduct a screening of the company. In 2018, we carried out an internal review of the Group's use of agents and identified measures to improve the operational management of agents. The focus on robust risk management of agents will continue across all geographical areas in 2019.

Managing our supply chain

ROCKWOOL's Supplier Code of Conduct (Supplier Code) explains in detail our expectations of all our suppliers and of their suppliers. Accepting the ROCKWOOL Supplier Code or having the supplier's own equivalent code of conduct approved is a prerequisite for becoming a ROCKWOOL supplier.

Our online e-procure system for supplier management, selection and contracting is now fully implemented, meaning that almost all expenditures within the Group are centrally managed, instead of partly decentralised to our subsidiaries.

This also means that a large number of existing suppliers are in the process of being reassessed. This reassessment also covers sustainability. Of our existing suppliers, 43 percent have been reassessed for acceptance of the ROCKWOOL Supplier Code. We expect to reassess the remaining suppliers during 2019.

Between now and 2020, we will be implementing a risk-based, due diligence and collaborative approach to sustainable sourcing. This will involve working with suppliers to assess gaps, build awareness and provide incentives for sustainable improvements.

During 2018, six of our suppliers were audited by third parties. This led to zero corrective action plans. However, one supplier refused the external auditor access to the required documentation. We are currently in dialogue with this supplier.

Human rights across ROCKWOOL

We oppose all discrimination due to age, gender, race, colour, religion, political opinion, social origin or any other human rights aspects. We let our employees know that any incident of discrimination must be reported – and they can do so safely to their manager or via the whistleblower system.

We also rigorously support the right to exercise freedom of association and collective bargaining. We are opposed to child labour and do not use forced or compulsory labour or knowingly engage with business partners that do so. In 2019, we will carry out a human rights risk assessment across our value chain including our own operations to better understand our risk in this area as the basis for further activities.

2030 sustainability goals

We have five operational goals across energy, climate, water, waste and safety to track our performance and keep us accountable to our customers, colleagues and communities. These have been designed to drive progress on the SDGs by reducing the negative impact from operations on material issues. Our sixth goal is our reclaimed waste goal, which relates to product impact. Together, these goals provide additional measures of how our products really do contribute to a better future for people around the world. More detail on progress against the goals can be found in the relevant chapters of this report.

CO₂ emissions



Our goal: Reduce CO₂ emission intensity (CO₂/t stone wool) from our stone wool production facilities by 20% by 2030 (10% by 2022)

↓ **20%**
by 2030

Safety, health and wellbeing



Our goal: Reduce Lost Time Incident (LTI) frequency rate by 10% and ensure zero fatalities annually

↓ **10%**
annually

Reclaimed waste



Our goal: Increase the number of countries where we offer recycling services for our products to 30 by 2030 (15 by 2022)

5 → 30
by 2030

Energy efficiency



Our goal: Reduce energy consumption (kWh/m²) within own (non-renovated) offices by 75% in 2030 (35% by 2022)

↓ **75%**
by 2030

Water consumption



Our goal: Reduce water intensity (m³/t stone wool) within our manufacturing facilities by 20% by 2030 (10% by 2022)

20%
by 2030

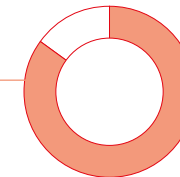


Landfill waste



Our goal: Reduce landfill waste (tonnes) from our manufacturing facilities by 85% by 2030 (40% by 2022)

85%
by 2030



The baseline for five of the six Group sustainability goals is 2015. Our safety goal baseline is revised annually.

Key performance metrics

Aligning with leading global standards



ROCKWOOL is a participant in the [United Nations Global Compact](#) and we would like to express our continued support for the Global Compact by hereby renewing our ongoing commitment to the initiative and its principles.

Our reporting is informed by the [Global Reporting Initiative \(GRI\) Standards](#). The Standards highlight a number of material topics across three categories: economic, environmental and social, which are material to our business.

For our complete GRI index, please visit www.rockwoolgroup.com/sustainability



Our performance on CO₂ emissions is regularly disclosed to stakeholders and through international reporting platforms such as the Carbon Disclosure Project (CDP). In 2018, ROCKWOOL received a score of B.



Our ESG performance was rated 'Prime' – the highest rating category – by leading sustainable investment rating agency ISS-oekom in April 2018.

Product impact metrics

	Unit	2017	2018	Notes	SDG impact
Carbon emissions avoided in the lifetime of building insulation sold	Mt CO ₂	193	206	1	SDG 13
Carbon emissions avoided in the lifetime of industrial insulation sold	Mt CO ₂	1 133	1 176	1	SDG 13
Energy saved in the lifetime of building insulation sold	TWh	853	908	1	SDG 7
Energy saved in the lifetime of technical insulation sold	TWh	5 220	5 372	1	SDG 7
PM air emissions avoided in the lifetime of building insulation sold	kt		84	2	
SOx air emissions avoided in the lifetime of building insulation sold	kt		256	2	
NOx air emissions avoided in the lifetime of building insulation sold	kt		302	2	
Water saved by precision growing products sold	kL	89 364	93 907	3	SDG 6
Fertiliser saved by precision growing products sold	t	16 978	17 623	3	SDG 2
Land use reduction by precision growing products sold	ha	26 489	27 495	3	SDG 2
Yield gain of vegetables by precision growing products sold	kt	1 870	1 941	3	SDG 2
Stone wool collected and recycled through ROCKWOOL recycling services	t	120 000	129 000	4	SDG 12
Significantly improved learning environments from acoustic solutions sold	Number of students		339 000	5	SDG 3

Notes

- ¹ Energy and carbon emission savings in the lifetime of our sold building insulation and technical insulation products is calculated following methodology developed by Navigant, who also validate the annual results. See www.rockwoolgroup.com/carbon-impact
- ² Annual avoided air emissions from heating energy production as a result of our sold building insulation calculated using methodology developed by Navigant, who also validate the annual results. The methodology for avoided air emissions was first developed and applied for the 2018 results. See www.rockwoolgroup.com/carbon-impact
- ³ Quantitative comparison between soil-based cultivation systems and stone wool systems using methodology developed by Wageningen University & Research, who also validate annual results. Methodology available at www.rockwoolgroup.com/precision-growing-impact
- ⁴ Stone wool building insulation received at our factories for recycling and estimated dry weight of stone wool growth media recycled by external partners.
- ⁵ The impact on learning conditions from acoustic products sold is calculated using methodology developed by Ramboll, who also validate the annual result. The methodology was first developed and applied for the 2018 result. See www.rockwoolgroup.com/acoustic-impact

Operational metrics

Category	Indicator	GRI disclosure number	Value	2015	2016	2017	2018	Note number
Anti-corruption	Confirmed incidents of corruption and actions taken	205-3	Number	3	1	3	2	
Management approach disclosures	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations	419-1	kEUR	–	–	–	–	
	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	206-1	kEUR	–	–	–	–	
Workplace safety	Fatalities	403-9	Number	–	–	–	1	1
	Frequency of LTI – employees & contractors (per million hours worked)	403-9	No./mill hrs	3.1	3.2	3.5	3.1	2
Environmental laws and regulations – non-compliance	Factories certified to ISO 14001 and/or OHSAS 18001 and/or ISO 50001	n/a	Number	17	17	21	22	
	Share of stone wool factories certified to ISO 14001 and/or OHSAS 18001 and/or ISO 50001	n/a	%	63	61	75	78	
	Audits for environment, health, safety	n/a	Number	123	107	91	186	3
	Fines – monetary value	307-1	kEUR	1	2	3	2	
Energy	Energy consumption	302-1	GWh	4519	4536	4817	5303	4, 5, 6
	Energy per tonne stone wool	302-3	Index	100	99	97	98	4, 6
Greenhouse gas (GHG) emissions	Total direct and indirect greenhouse gas emissions	305-1, 305-2	Mt CO ₂ e			2.0	2.2	6, 7
	Total direct and indirect CO ₂ emissions	305-2	Mt CO ₂	1.60	1.59	1.71	1.85	4, 5, 6
	CO ₂ direct (Scope 1)	305-1	Mt CO ₂	1.29	1.28	1.40	1.51	4, 5, 6
	CO ₂ indirect (Scope 2)	305-2	Mt CO ₂	0.31	0.30	0.31	0.34	5, 6
	CO ₂ intensity direct (Scope 1) per tonne stone wool	305-1	Index	100	98	98	97	4, 5, 6
	CO ₂ intensity indirect (Scope 2) per tonne stone wool	305-2	Index	100	95	90	91	5, 6
CO ₂ intensity direct and indirect (Scope 1+2) per tonne stone wool	305-1, 305-2	Index	100	98	97	96	4, 5, 6	

Operational metrics

Category	Indicator	GRI disclosure number	Value	2015	2016	2017	2018	Note number
Air emissions	NO _x intensity	305-7	Index	100	123	121	132	6, 8, 9
	SO ₂ intensity	305-7	Index	100	101	88	83	6, 8
	CO intensity	305-7	Index	100	29	33	3	6, 8
	Ammonia intensity	305-7	Index	100	90	87	85	6, 8
	Phenol intensity	305-7	Index	100	94	100	100	6, 8
	Formaldehyde intensity	305-7	Index	100	100	120	80	6, 8
	Particulate matter (PM10) intensity	305-7	Index	100	147	147	123	6, 8
Water consumption	Water consumption total	303-5	Mm ³	3.23	3.32	3.51	3.70	4, 6
	Water consumption excl. rainwater	303-5	Mm ³	3.02	3.19	3.32	3.56	4, 6
	Total water consumption from all areas with water stress	303-5	Mm ³			0.27	0.28	6, 10
	Water intensity per tonne stone wool	303-1	Index	100	104	100	98	4, 6
Water withdrawal by source	Groundwater own abstraction	303-3	Mm ³	0.93	1.00	1.02	1.11	6
	Municipal water a.o. utilities	303-3	Mm ³	1.80	1.89	1.99	2.10	4, 6
	Rainwater own abstraction	303-3	Mm ³	0.22	0.13	0.19	0.14	4, 6
	Surface water own abstraction	303-3	Mm ³	0.29	0.30	0.32	0.35	6
Waste and recycling	Total waste generated	306-2	t	189 252	201 531	222 152	218 501	6
	Total hazardous waste generated	306-2	t			26 551	18 236	6, 11
	Waste landfilled	306-2	t	93 761	91 185	89 538	98 238	4, 6, 12
	Waste for external recycling	306-2	t	75 480	81 672	96 243	87 123	4, 6
	Waste for external recovery (energy)	306-2	t	8 600	13 160	2 547	2 997	6, 13
	Other external waste disposal	n/a	t			36 371	33 141	6, 14
	Recycling of waste from other industries	n/a	t	788 035	607 526	596 400	622 559	6, 15
	Average % recycled content	301-2	%	35.9	27.0	24.5	23.5	6, 15

Notes to Key Performance Indicators for Operations

¹ Fatal accident at our production facility in Gladbeck.

² Lost days count begins the day after the accident and connotes scheduled work days. Minor (first-aid level) injuries are not included.

³ The number includes external audits related to environment and health and safety carried out by authorities, certified bodies etc. together with Group SHE audits carried out at the factories.

⁴ Data corrected for 2015, 2016 and 2017.

⁵ 2017 data updated with data verified after publishing of the 2017 report.

⁶ Data covers 28 stone wool factories.

⁷ N₂O emissions are estimated. Data series starts in 2017.

⁸ Values for five factories in South East Asia and China based on representative average.

⁹ Data corrected for 2015.

¹⁰ New indicator based on water scarcity assessment conducted for ROCKWOOL by Ramboll Environ in 2017. Data series starts in 2017.

¹¹ Data corrected for 2017. Hazardous waste data series starts in 2017.

¹² Deep well injection and on-site storage not part of landfill.

¹³ Change in methodology from 2017.

¹⁴ Other waste disposals e.g. composting, deep well injection, incineration. Data series starts in 2017.

¹⁵ Includes secondary melt raw material and reclaimed waste, and excludes internal closed-loop recycling. Change in methodology in 2018, with revised numbers for the previous years.

The ROCKWOOL® trademark

The ROCKWOOL trademark was initially registered in Denmark as a logo mark back in 1936. In 1937, it was accompanied with a word mark registration; a registration which is now extended to more than 60 countries around the world.

The ROCKWOOL trademark is one of the largest assets in ROCKWOOL Group, and thus well protected and defended by us throughout the world.

ROCKWOOL Group's primary trademarks:

ROCKWOOL®

Rockfon®

Rockpanel®

Grodan®

Lapinus®

Additionally, ROCKWOOL Group owns a large number of other trademarks.

Credits

Page 17: Frank Boutrup Schmidt

Page 18 right: Casus Adam Banka

Page 22: FOTOFLUG.de GmbH

Page 25: Click&Boo

Page 26: BIG

Page 28: Studio Shai Gil

Page 30: Michael Best



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