

# DECARBONIZING BUILDING

2022 CLIMATE REPORT



# In 2022 we made great strides on our mission to decarbonize building.

From our operations to construction and making buildings sustainable in use, we are decarbonizing building across its life cycle for a net-zero future.



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Cover Image: Boston University's Data Science Center with ECOPact low-carbon concrete

# DEAR STAKEHOLDERS,

With today's megatrends, from the rise in population and urbanization to improving living standards, the construction sector has an essential role to play to build better with less for a net-zero future.



**“At Holcim, we are on a mission to decarbonize building, from our operations, to driving circular construction and making buildings more sustainable in use.”**

**JAN JENISCH**  
Chief Executive Officer

**“We take a rigorous, science-driven approach to our net zero journey. In 2022 we upgraded our 2030 climate targets to be in line with the 1.5°C scenario and validated them with SBTi.”**

**MAGALI ANDERSON**  
Chief Sustainability and Innovation Officer



◀ Seven Gardens Oak House quarter in Wiesbaden, Germany with DYNAMax, the ultimate performance concrete

### Dear Stakeholders,

Climate action is at the core of Holcim's "Strategy 2025 – Accelerating Green Growth", to become the global leader in innovative and sustainable building solutions. With our 60,000 colleagues, we are on a mission to decarbonize building across its life cycle to build cities that work for people and the planet.

We are accelerating our net-zero journey to decarbonize Holcim. Taking a science-driven approach, we upgraded our climate targets to align them with the 1.5°C framework and validated them with the Science Based Targets initiative. We are making progress in carbon capture, utilization and storage, and committed to invest CHF 2 billion by 2030 in mature technologies to capture more than 5 million tons of CO<sub>2</sub> per year.

In 2022, we delivered on all our net-zero levers and increased our green investments by 15 percent, reaching CHF 403 million. We deployed decarbonized materials in our product formulation, such as calcined clay; we adopted more alternative and renewable energy to power our operations; and we scaled up our low-carbon building solutions to build better with less.

Advancing low-carbon construction, we reached 13 percent of our ready-mix net sales with ECOPact, the world's broadest range of low-carbon concrete, and deployed ECOPlanet low-carbon cement in 27 markets. We empowered smart design, with solutions like our proprietary 3D printing inkTectorPrint, reducing material use by up to 50 percent, and we continue to innovate to make a bigger impact.

We are driving circular construction across key metropolitan areas to build new buildings from old ones. In 2022, we recycled 6.8 million tons of construction and demolition waste into new building solutions, on track to exceed our 2025 target of 10 million tons. Building on the success of the world's first cement with 20 percent

construction and demolition waste inside, in the Swiss market, we are scaling it up, starting in Europe.

We are expanding our reach to make buildings more sustainable in use with our growing range of Solutions & Products, from roofing to insulation systems, driving energy efficiency. They now represent 19 percent of our net sales. With our successful transformation, we reduced our CO<sub>2</sub> per net sales by 21 percent in 2022, and commit to reducing it by over 10 percent in 2023.

Accelerating the shift to net-zero cities requires deep partnerships across our value chain. In 2022 we engaged with public authorities to evolve building standards, with cities to scale up green demand in their projects, and with architects and engineers to specify sustainable solutions in their designs. We did this as a key partner for our customers, bringing solutions that help them achieve their sustainability goals.

Join us to build a net-zero future that works for people and the planet!

**JAN JENISCH**  
Chief Executive Officer

**MAGALI ANDERSON**  
Chief Sustainability and Innovation Officer

# MAKING PROGRESS TO NET-ZERO

Advancing “Strategy 2025 – Accelerating Green Growth”, Holcim reduced its CO<sub>2</sub> per Net Sales by 21 percent in 2022 and aims to reduce by a further 10 percent in 2023, while delivering progress across all its strategic targets.

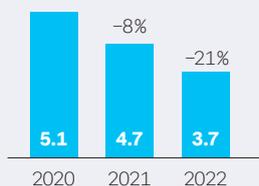
ACCELERATING GREEN GROWTH IMPACT DASHBOARD	2022 IMPACT	
<b>ECOPACT READY-MIX NET SALES</b>	<b>13%</b>	
<b>SOLUTIONS &amp; PRODUCTS NET SALES</b>	<b>19%</b>	
<b>GREEN CAPEX</b> CHF	<b>403M</b>	
<b>SUSTAINABLE FINANCE</b>	<b>38%</b>	
<b>REDUCTION CO<sub>2</sub>/T CEM</b> YEAR ON YEAR	<b>2%</b>	

<p><b>RECOGNIZED CLIMATE LEADERSHIP</b></p>	 <p>SCIENCE BASED TARGETS DRIVING AMBITIOUS CORPORATE CLIMATE ACTION</p> <p><b>First with net-zero targets validated by SBTi</b></p>	 <p><b>Double “A” for Climate and Water</b></p>	 <p><b>Signatory since 2017</b></p>
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REDUCTION OF CO<sub>2</sub> PER NET SALES

**-21%**  
Reduction of CO<sub>2</sub>/net sales<sup>1</sup>

REDUCTION IN CO<sub>2</sub>/NET SALES %<sup>1</sup>



<sup>1</sup> 2022 Scope 1 + Scope 2 CO<sub>2</sub> emissions/net sales

**>10%**  
Reduction of CO<sub>2</sub>/net sales in 2023

2025 TARGETS

**25%**

**30%**

**500M**

**40%**

**2%-4%**

STRETCHING OUR AMBITIONS FOR A 1.5°C FUTURE

Upgraded

**1.5°C**

aligned 2030 targets, validated by SBTi

**2.0BN**

CCUS CAPEX by 2030  
Cumulative in CHF

**ECO**Pact

**13%**

Ready-mix net sales

**ECO**Planet

in

**27**

markets

**ELEVATE**  
**ISOGARD™ HD**

**40%**

higher thermal performance, compared to competitive products on the market

**338M**

EU Innovation Fund grants  
EUR

# OUR PURPOSE: BUILDING PROGRESS FOR PEOPLE AND THE PLANET

Holcim is Accelerating Green Growth to become the global leader in innovative and sustainable building solutions.

Building greener cities, empowering smart infrastructure from renewable energy to green mobility and improving quality of life for all.

We are at the forefront of decarbonizing building end-to-end, in line with our purpose to build progress for people and the planet.



## IMPROVING LIVING STANDARDS FOR ALL

With our world building the equivalent of New York City every month, driven by rising population and urbanization, we need to build better with less. Materials like DYNAMax and 3D Tector Print make buildings that require up to 50 percent less material.



## BUILDING GREENER CITIES

We're building greener cities with our sustainable building solutions, like Elevate's green roof at Thammasat University in Thailand, and ECOPact low-carbon concrete at Boston University's Data Science Center, with 30 percent lower CO<sub>2</sub> compared to conventional concrete.

## EMPOWERING SMARTER INFRASTRUCTURE

Holcim solutions are essential to enabling the smarter infrastructure that our growing world needs, ranging from Milan's CityLife urban redevelopment project, which reimagines living and working in a car-free zone, to megaprojects such as Mexico's Maya train.

# ACCELERATING GREEN GROWTH



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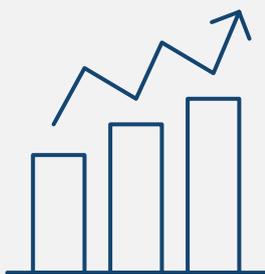
Successful transformation 12



# CLIMATE IS AT THE HEART OF OUR STRATEGY

Holcim puts climate action at the core of its “Strategy 2025 – Accelerating Green Growth” to become the global leader in innovative and sustainable building solutions.

## THE FOUR PILLARS OF OUR “STRATEGY 2025 – ACCELERATING GREEN GROWTH”



### ACCELERATING GROWTH

Accelerating growth across all markets with leading profitability and cash flow, driven by innovative and sustainable building solutions.



### EXPANDING SOLUTIONS AND PRODUCTS

Reaching 30 percent of Group net sales by 2025, from new builds to repair and renovation. Becoming global leader in roofing and expanding specialty building solutions, as double-digit growth engines.



### LEADING IN INNOVATION AND SUSTAINABILITY

Innovating to remain at the forefront of green building solutions and driving circular construction to build better with less.



### DELIVERING SUPERIOR PERFORMANCE

Fostering a high-performance culture while operating at the highest level of ethics and integrity to deliver ambitious financial and sustainability targets in line with net-zero roadmap.

## “STRATEGY 2025 – ACCELERATING GREEN GROWTH” INCLUDES AMBITIOUS SUSTAINABILITY TARGETS TO BE ACHIEVED BY 2025:

# 25%

of ready-mix sales from ECOPact, with at least 30% less CO<sub>2</sub>

# 10M

Tons construction and demolition waste recycled per annum

# 500M

CHF of Green CAPEX per annum

# >40%

of financing linked to sustainability and ESG

## OUR BUSINESS IS ORGANIZED TO DECARBONIZE BUILDING:

Across our four regions we are driving low carbon and circular construction to build better with less. Our Solutions & Products business is making buildings more sustainable in use from energy-efficiency to green retrofitting.



### NORTH AMERICA

In our number-one region we are leading the shift to sustainable building from foundation to rooftop – from commercial to residential, new building to repair and renovation – capturing the new growth dynamic for innovative and sustainable building solutions driven by green stimulus, new construction standards and customer expectations.



### EUROPE

The Europe region is at the forefront of decarbonizing building, driven by advanced building norms, stimulus programs and customers demand. Our European footprint offers the most advanced sustainability profile in the Holcim Group, from green operations and solutions to next-generation technologies like carbon capture, utilization and storage.



### LATIN AMERICA

Healthy economic fundamentals in Latin America, combined with our strong asset and market positions, put us in position to help improve living standards across the region, supporting sustainable urbanization and infrastructure.



### ASIA, MIDDLE EAST & AFRICA

The world's megacities are concentrated here. We're introducing ECOPact and ECOPlanet to accelerate green construction, to provide the affordable housing and green infrastructure that this growing region demands. Holcim is leading the development of innovative and sustainable solutions for emerging markets such as 3D printing and modular solutions for low-cost housing while working with governments to advance carbon legislation.



### SOLUTIONS & PRODUCTS

Holcim's successful transformation has been driven by the fast expansion of Solutions & Products. Through Solutions & Products we are now far more involved in reducing the 70 percent of emissions that come from buildings in use, through conventional repair and refurbishment as well as targeted green retrofitting.



# SUCCESSFUL TRANSFORMATION

Holcim had a record 2022. We successfully transformed our portfolio by expanding our Solutions & Products business and shifting toward advanced markets. This transformation will allow us to continue delivering record performance while decarbonizing building at the same time. Today, our CO<sub>2</sub> emissions per net sales is 21 percent lower than in 2021. We will reduce it by over 10 percent again in 2023.

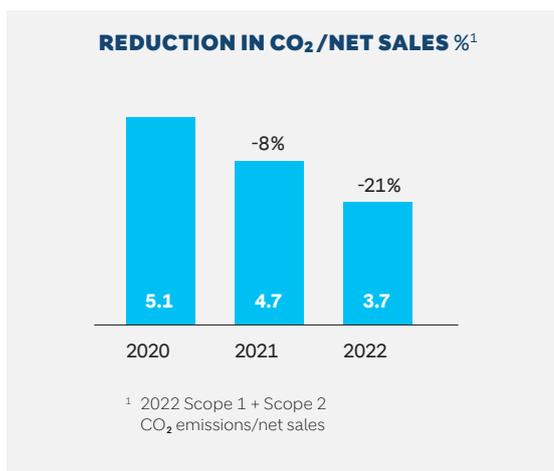
## Where building emissions come from

Buildings account for 37 percent of the world's CO<sub>2</sub> emissions. Thirty percent are generated at the construction phase and 70 percent are linked to buildings in use. On our net-zero journey, we are committed to decarbonizing our own operations and reducing buildings' share of emissions.

## Fast expansion in Solutions & Products

In the last two years we have invested over CHF 6 billion in value-creative acquisitions in Solutions & Products. Through Solutions & Products we are now far more involved in reducing the 70 percent of emissions that come from buildings in use, through conventional repair and refurbishment as well as targeted green retrofitting.

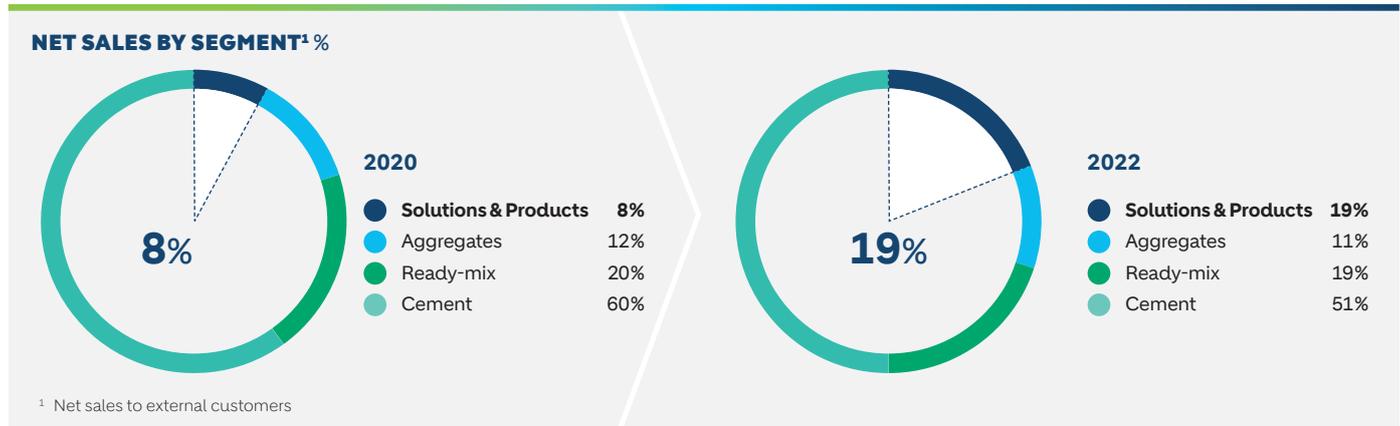
The largest business in Solutions & Products is roofing and insulation, which is essential to a building's energy efficiency. We have developed this business in two years, on track to generate USD 4 billion in net sales in 2023.



▼ National Cultural Center, Baku, Azerbaijan designed by Zara Hadid Architects and built with Elevate roofing systems



## SOLUTIONS & PRODUCTS REACHING 19 PERCENT OF NET SALES



### Refocusing our business across core markets

We are refocusing on advanced markets, and especially the most attractive North America market, as part of our transformation. Green stimulus, renovation requirements and new building regulations create a growing demand for innovative and sustainable building solutions in these markets. The policy environment is also more favorable for decarbonizing construction, including our own operations.

The US Inflation Reduction Act, for example, includes USD 369 billion in subsidies for green technology investment in the US – including carbon capture, utilization and storage (CCUS), low-carbon building materials, Environmental Product Declarations (EPDs), and industrial decarbonization projects. Europe is considering its own Net-Zero Industry Act to focus investment on strategic decarbonization projects for critical industries. European countries are also strengthening the commercial viability of low-carbon building with policies such as France’s RE2020.

These are bankable commitments. All players in the value chain – from homeowners to start-ups to energy companies to Holcim – can rely on them to build the net-zero economies the world needs. Such policy and market conditions are vital to decarbonizing building.

### Accelerating green growth

Our number-one priority and strategy is Accelerating Green Growth, as a global leader in innovative and sustainable building solutions. We are decarbonizing our own operations, from green energy and mobility to low-carbon product formulation, all the way to next generation technologies like CCUS. We remain committed to increasing our share of Green CAPEX year on year and to stay at the forefront of decarbonizing construction.



Source: Global Alliance for Buildings and Construction, 2022 Global Status Report for Buildings and Construction

### Our updated net-zero targets

In 2022 we updated our 2030 net-zero targets to be aligned with a 1.5°C scenario of global warming and were among the first in our sector to have those targets validated by the Science Based Targets initiative. In this Climate Report you can see those updated targets for both direct and indirect emissions, and how they have been adjusted to exclude the effect of divestments.

# HOLCIM'S NET-ZERO PLEDGE

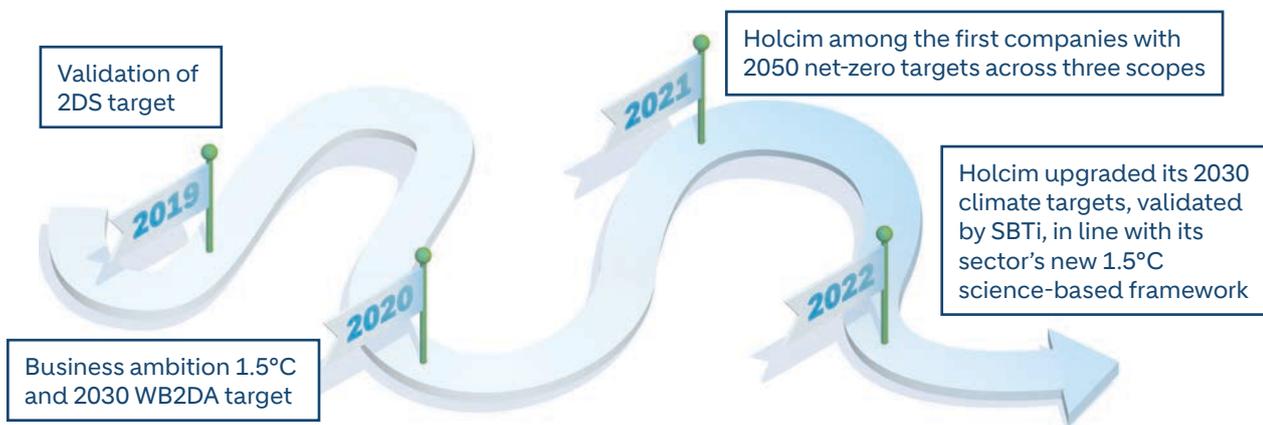
▲ Etihad Museum in  
Dubai, UAE with Elevate  
UltraPly TPO roofing  
membrane



# DECARBONIZING HOLCIM TO BECOME NET-ZERO

At Holcim, we take a science-driven approach to become a net-zero company and upgraded our targets to be in line with the 1.5°C framework.

## KEY MILESTONES ACHIEVED AND NEXT STEPS



### Our net-zero pledge

Climate action is at the core of our strategy. Today we have 2030 and 2050 net-zero targets validated by the Science Based Targets initiative (SBTi) across all three scopes.

This is the result of a number of milestones:

- In 2019, our CO<sub>2</sub> targets were validated as consistent with a scenario of limiting global warming to 2°C.
- In 2020, we were the first global building solutions company to sign the United Nations Global Compact (UNGC)'s "Business Ambition for 1.5°C" initiative, with intermediate 2030 targets approved by the SBTi in alignment with a net-zero pathway.
- In 2021, our 2050 CO<sub>2</sub> targets were among the first long-term targets validated by SBTi, consistent with the new net-zero standard across all scopes, setting a reference for our industry.
- In 2022, we upgraded our 2030 climate targets and validated them with the SBTi, in line with our sector's new 1.5°C science-based framework.

With these upgraded targets, we confirmed our commitment to decarbonize building following the most advanced science.

### OUR TARGETS

Holcim commits to reach net-zero greenhouse gas emissions across the value chain by 2050.

### Near-term targets

Holcim commits to reduce gross Scope 1 and 2



### DID YOU KNOW Climate action is not new to Holcim

We were among the first industries in the world to account for its emissions and to set reduction targets as part of the Cement Sustainability Initiative in 2002. The first international agreement on greenhouse gas emissions reduction, the Kyoto Protocol, was adopted in 1997 and entered into force in 2005. Holcim acted earlier than the Kyoto Protocol with its first target set in 2002 and met in 2009.

GHG emissions by 25 percent per ton of cementitious materials by 2030 from a 2018 base year.<sup>1</sup>

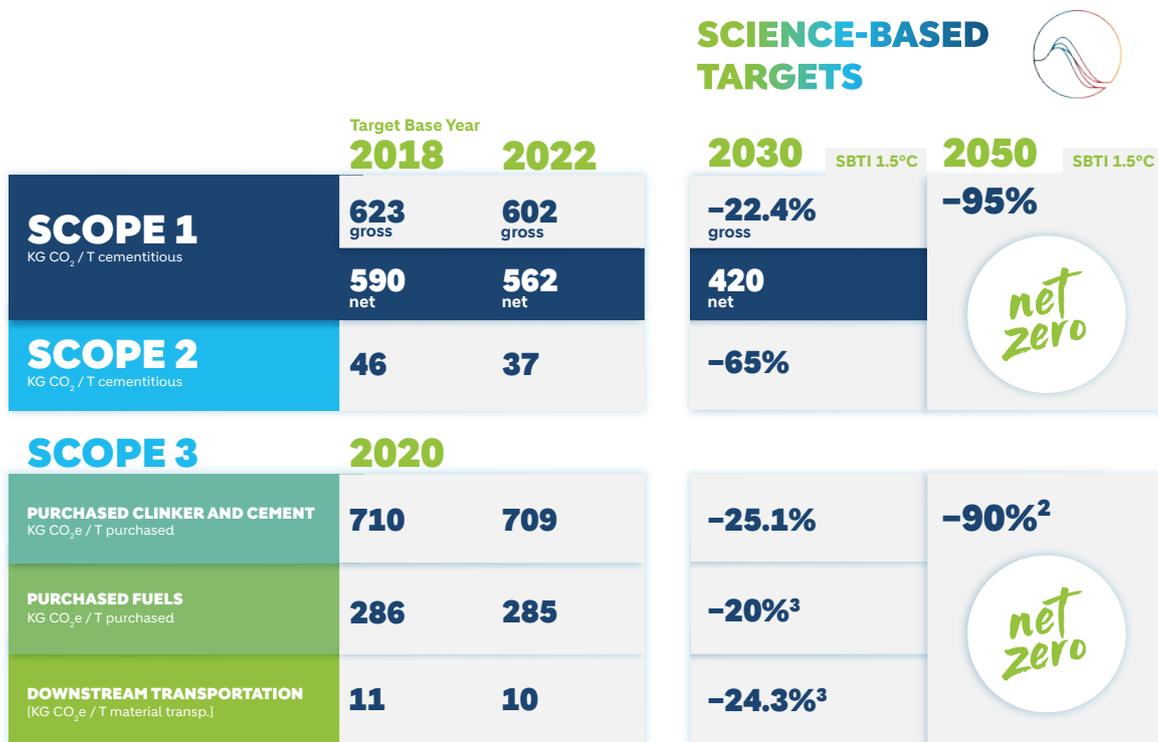
Within this target, Holcim commits to reduce gross Scope 1 GHG emissions 22.4 percent per ton of cementitious material and Scope 2 GHG emissions 65 percent per ton of cementitious materials within the same timeframe.<sup>1</sup>

Holcim commits to reduce gross Scope 3 GHG emissions from purchased goods and services by 25.1 percent per ton of purchased clinker and cement by 2030 from a 2020 base year. Holcim also commits to reduce Scope 3 GHG emissions

from fuel and energy related activities 20 percent per ton of purchased fuels by 2030 from a 2020 base year. Furthermore, Holcim commits to reduce Scope 3 GHG emissions from downstream transport and distribution 24.3 percent per ton of materials transported within the same timeframe.

**Long-term targets**

Holcim commits to reduce Scope 1 and Scope 2 GHG emissions 95 percent per ton of cementitious materials by 2050 from a 2018 base year.<sup>1</sup> Holcim also commits to reduce absolute Scope 3 GHG emissions 90 percent by 2050 from a 2020 base year.<sup>2</sup>



<sup>1</sup> The target boundary includes land related emissions and removals from bioenergy feedstocks.  
<sup>2</sup> This net-zero validation was evaluated within the parameters of the Business Ambition for 1.5°C campaign, and covers categories 1, 3, 4, 6, 7 and 9 of Holcim's Scope 3 emissions.  
<sup>3</sup> Targets aligned with well-below 2°C

**What is new?**

Upgraded 2030 targets for a 1.5°C future: We upgraded our 2030 targets for Scope 1, 2 and 3 emissions, in line with the new 1.5°C framework.

Scope 1 and 2 gross emissions per ton of cementitious material will be reduced by 25 percent by 2030 from a 2018 base year (previously 21 percent). We will reduce CO<sub>2</sub> per ton of clinker and cement purchased from third parties by 25.1 percent from a 2020 base year (previously 20 percent).

Tailored to our portfolio: We updated our targets and baselines to reflect recent changes in company's portfolio such as the divestment of operations in India, Russia and Brazil.

Wider scope: In 2022 we upgraded our CO<sub>2</sub> inventories to include all categories of the Scope 3 Greenhouse Gas (GHG) protocol. Aspects such as the use of sold products and financial investments have now been included in the inventory, expanding transparency across our full value chain.

For more information on our Scope 3 emissions, see page 36.

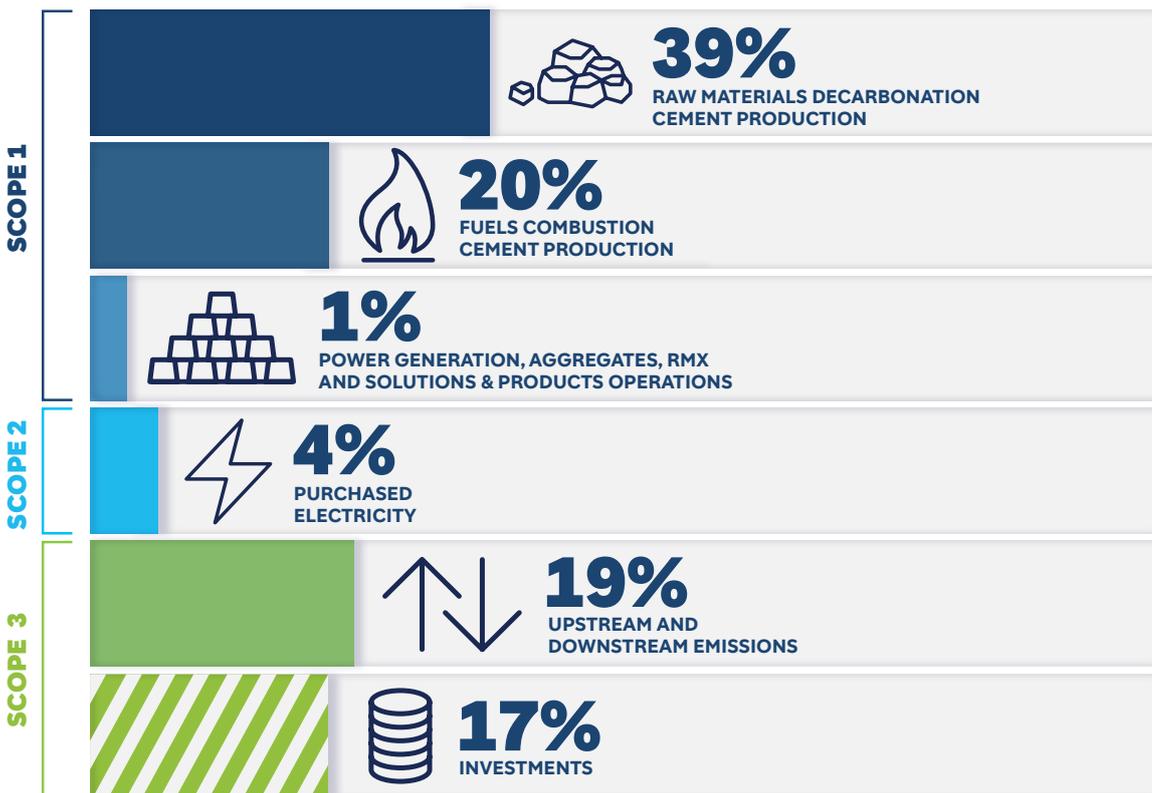
# DECARBONIZING HOLCIM TO BECOME NET-ZERO CONTINUED

## Our CO<sub>2</sub> footprint

Scope 1 emissions account for 60 percent of our footprint and are at the core of our emissions reduction strategy. Scope 1 includes all emissions that are released directly from our operations. Most of these come from cement production. 39 percent of our emissions are generated during the decarbonation of the raw materials we use to produce clinker. Fuel combustion necessary to heat the cement kilns is another significant source of emissions. A small share of Scope 1 emissions come from operations linked to Solutions & Products, aggregates and ready-mix concrete. Scope 2 emissions account for 4 percent of our

carbon footprint. Scope 2 includes indirect emissions from the generation of purchased electricity consumed in the company’s owned or controlled equipment. Scope 3 emissions account for 36 percent of our carbon footprint. Scope 3 includes all other indirect emissions generated in our supply chain, such as for transportation and the extraction and production of purchased materials and fuels. Scope 3 also include direct emissions from non-consolidated companies and investments.

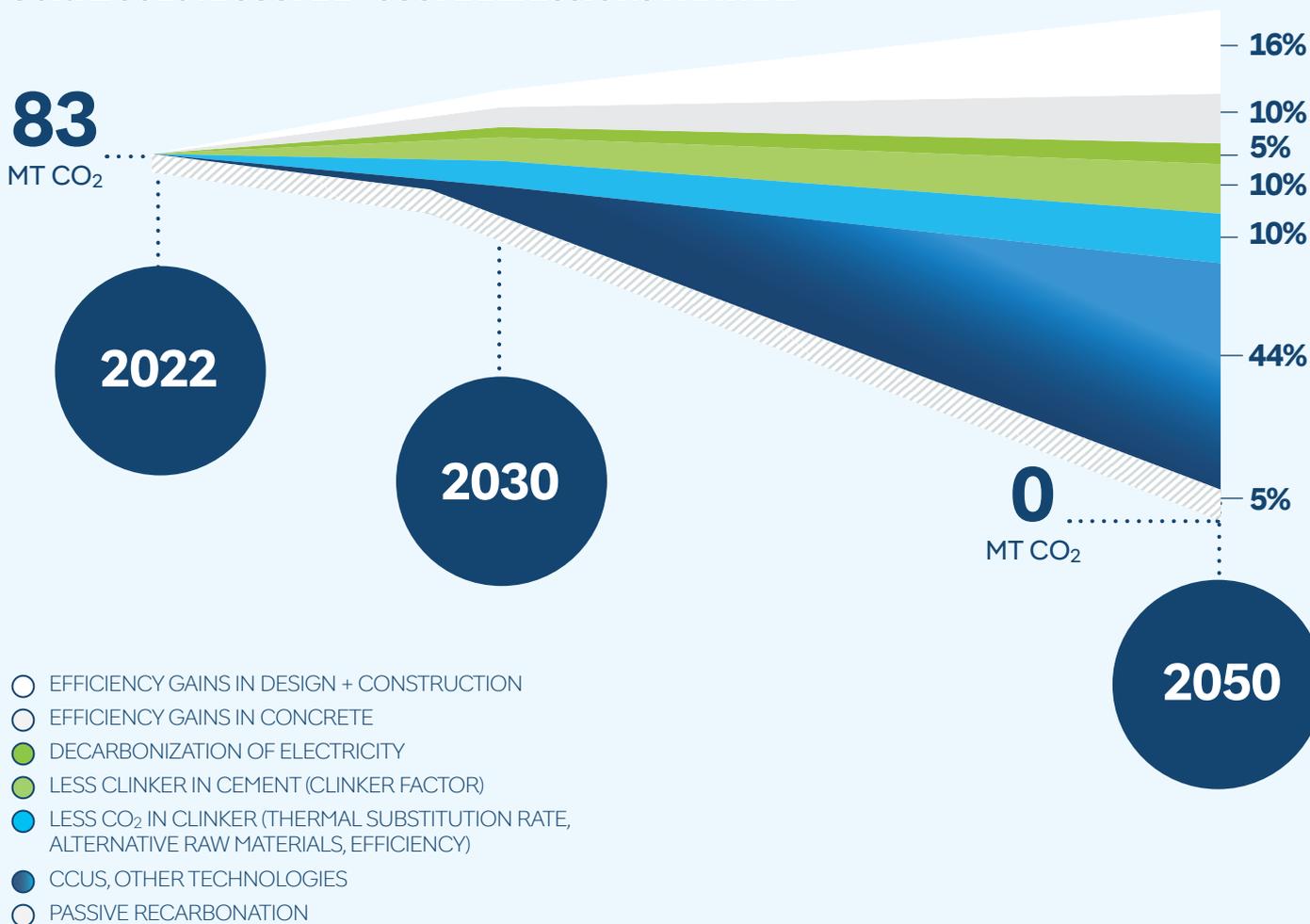
+ For more information on our Scope 3 emissions, see page 36



### HOLCIM'S PATHWAY TO NET-ZERO

Our pathway to 2030 is clear. Increasing focus on embodied carbon per m<sup>2</sup> of building is expected to move the market to more carbon-efficient construction. We will support this transition with our low-carbon products as well as enabling smart design systems like 3D printing that will support the progressive optimization of the structural elements, creating the same functional units with less material.

### OUR ABSOLUTE SCOPE 1 + SCOPE 2 EMISSIONS PATHWAY



# DECARBONIZING BUILDING FOR NET-ZERO FUTURE



▲ Hangzhou Yuhan  
Opera in China with  
Ductal Envelope

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# DECARBONIZING BUILDING FOR A NET-ZERO FUTURE

From our operations to our products all the way to buildings in use.

## GREEN OPERATIONS

DECARBONIZING HOLCIM

We are decarbonizing Holcim operations, from low-carbon product formulation and green mobility, all the way to next generation technologies like carbon capture, utilization and storage.

[+](#) Learn more on pages 30–45



## CIRCULAR CONSTRUCTION

BUILDING NEW FROM OLD

We drive circular construction to build new from the old. As a world leader in recycling, we recycled over 30 million tons of materials this year. We put circularity at the core of everything we do, from launching the world's first cement with 20 percent recycled construction and demolition waste, to upcycling plastic bags in roofing systems.

[+](#) Learn more on pages 58–59





## BUILDING BETTER WITH LESS

### DECARBONIZING CONSTRUCTION

With low-carbon materials such as ECOPact concrete, we're delivering 100 percent performance with at least 30 percent less CO<sub>2</sub>; as well as enabling smart design systems like 3D printing that can reduce material use by up to 50 percent.

[+ See pages 46–51](#)

## MAKING BUILDINGS SUSTAINABLE

### DECARBONIZING CITIES

A broad range of Holcim solutions, from roofing to insulation, are making buildings more sustainable in use to decarbonize our cities, driving energy efficiency and green retrofitting.

[+ See pages 52–55](#)

# BUILDINGS ARE AT THE CORE OF OUR WORLD'S NET-ZERO TRANSITION

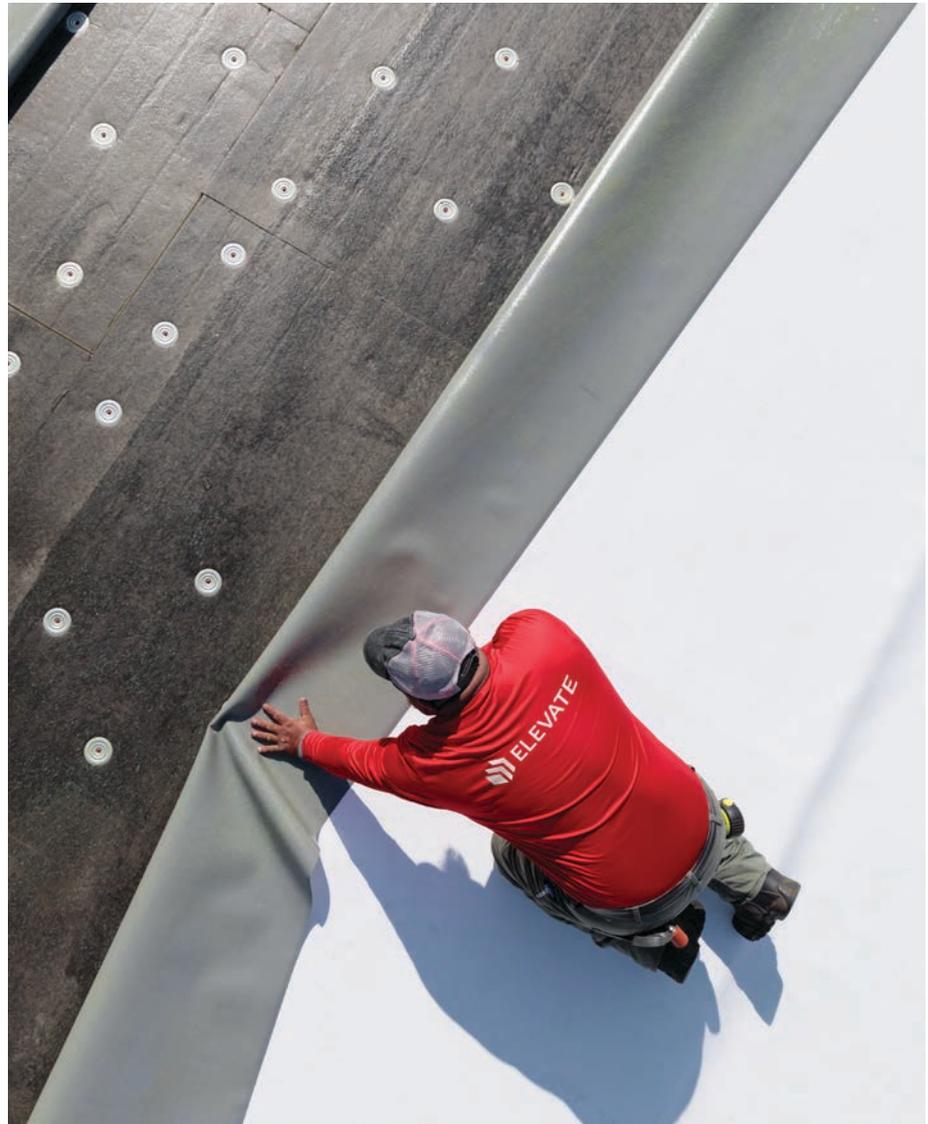
The building sector represents nearly 40 percent of our world's greenhouse gas emissions as well as being one of the greatest sources of energy loss in the world. In the EU alone, 2,860 terawatt hours of heat is wasted every year through heat loss from buildings. This is equivalent to the region's total energy needs for heating and hot water.



▲ A state-of-the-art example of smart design. "The Cloudscape of Haikou" project, China. Designed by MAD Architects



By designing our world's buildings for sustainability, from low-carbon construction, to energy-efficiency in use, we can fast track our world's transition to a 1.5°C future.



Our green building solutions are making this happen at scale, from ECOPact low carbon concrete, to smart building design leveraging concrete's thermal properties, all the way to our smart roofing and insulation systems driving energy efficiency, from Airium™, to Elevate, to PRB.

# PUTTING OUR SOLUTIONS TO WORK TO DECARBONIZE BUILDING

Our solutions decarbonize buildings across their full lifecycle, from low-carbon construction to making buildings more energy-efficient in use. Here's how.

## CONCRETE

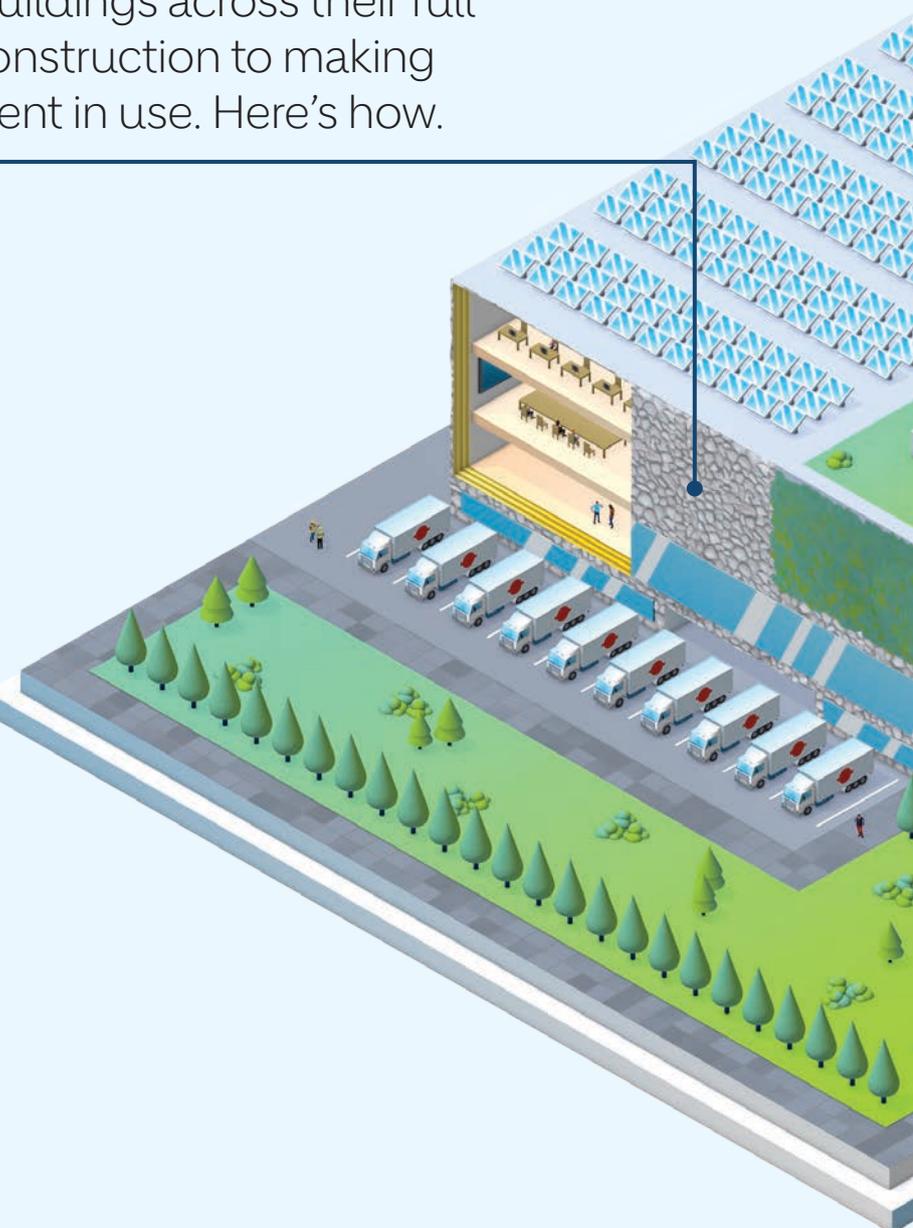
CONCRETE IS AN ESSENTIAL BUILDING MATERIAL FOR A NET-ZERO, GROWING AND URBANIZING WORLD. NO OTHER MATERIAL MATCHES ITS PERFORMANCE BENEFITS

**ECO**Pact    **DYNA**Max  
**ECO**Planet    *Hydromedia*

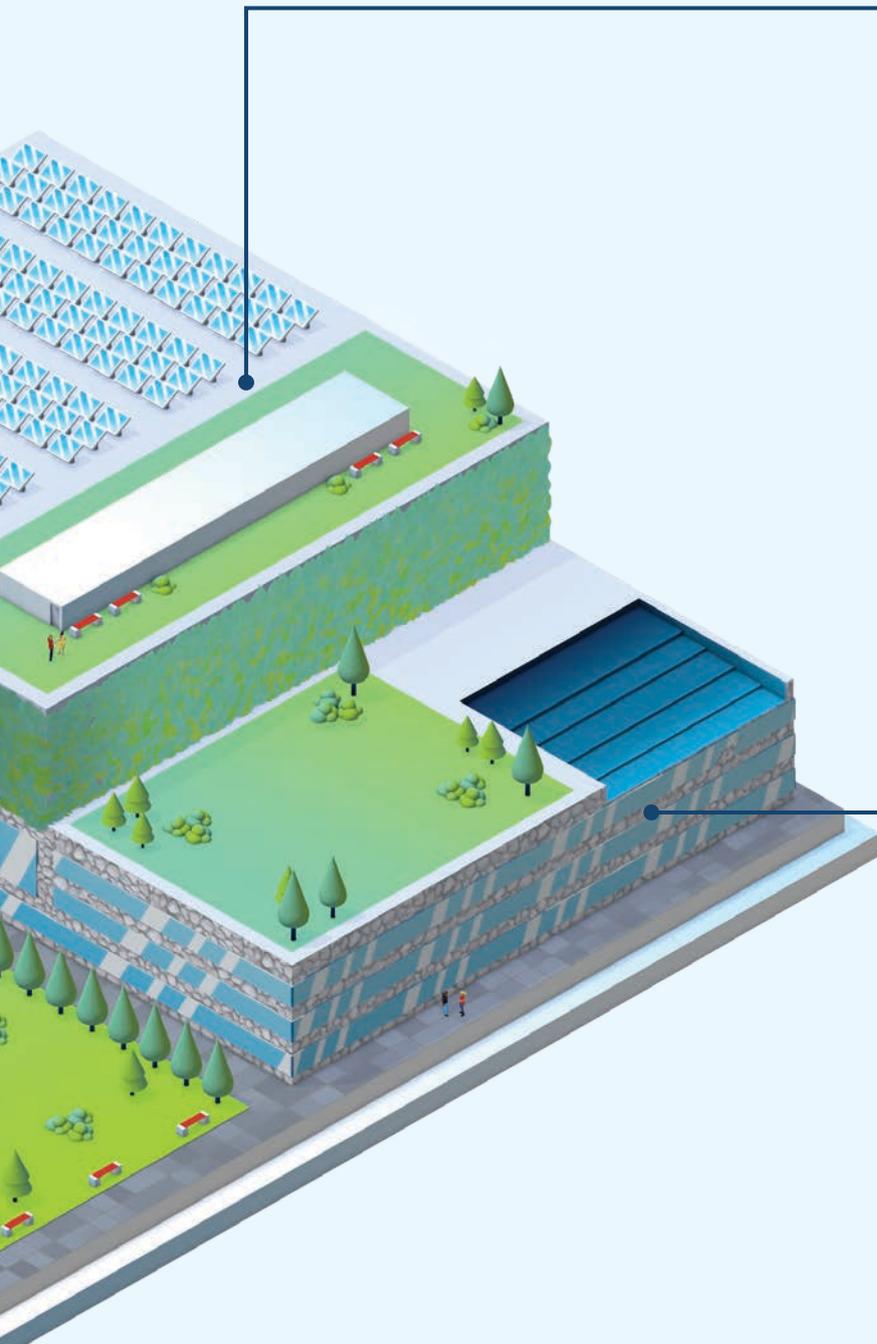
**Versatile:** Concrete opens infinite possibilities with its design flexibility. Known as liquid rock, it is the only building material that goes from liquid to solid, taking any shape. This makes it the ideal material to make everything from high-rise buildings and infrastructure to affordable housing, from 3D printing to high-strength prefabricated structures.

**Sustainable:** Concrete is local, affordable, enhances a building's energy efficiency with its thermal properties and can be low-carbon by design. We are decarbonizing it with our ECO Pact low-carbon concrete and leveraging its thermal properties for energy efficiency. Acting as a carbon sink, concrete can reabsorb more than 20 percent of its process CO<sub>2</sub> emissions throughout its lifespan in the right conditions.

**Recyclable:** Concrete is infinitely recyclable, just like glass. We are driving circular construction across our markets, developing concrete recycling infrastructure to expand urban mining to build new from the old. We will recycle 10 million tons of construction and demolition waste per year by 2025.



**High-performing and resilient:** Reinforced concrete protects our homes, cities and infrastructure like no other material, resisting disasters, from fires and floods to earthquakes and hurricanes.



## ROOFING

FROM COMMERCIAL FLAT ROOFS TO  
RESIDENTIAL SHINGLES



Our advanced roofing systems play an essential role in making buildings more sustainable in use, adding key functionalities to a building's envelope to make our cities greener. Insulated, cool and green roofs enhance a building's energy efficiency, reduce the urban heat island effect and can improve air quality with vegetation or smog-reducing granules, while solar-enabling roofing systems generate renewable energy. Our range of solutions covers flat roofing systems for commercial applications from warehouses to data centers. For residential applications we offer the most sustainable and circular shingles that are Green Circle certified.

## INSULATION

THERMAL INSULATION SYSTEMS FOR  
ENERGY EFFICIENCY AND GREEN  
RETROFITTING

ISOGARD® HD



Produits de Revêtement du Bâtiment

AIRIUM  
Insulation Redefined

Holcim offers high-performance insulation solutions enhancing the energy efficiency of our customers' buildings. Our patented ISOGARD® technology has the highest thermal efficiency per inch, delivering a 40 percent higher performance than other market solutions, while our SucraSeal bio-based spray foam has the highest bio-content in the industry. Our innovative solutions suit all types of building projects, from new builds to renovations, playing an increasing role in the repair and green retrofitting space.

# PARTNERING ACROSS THE VALUE CHAIN

We engage with key influencers across the building value chain to accelerate green demand for a 1.5°C future. We launched the Circular Cities Barometer to showcase leading cities at the forefront of circular living.

We work with public authorities to advance building codes and regulatory standards, empower architects and engineers to design and specify more low-carbon, circular and energy-efficient solutions. We partner with cities to fast-track success together. Our Circular Cities Barometer showcases leading cities at the

forefront of circular living and building to inspire all cities to join this transition. City by city, we partner to accelerate sustainable energy-efficient buildings, green mobility, material circularity with recycling hubs for urban mining and more nature for enhanced well-being.

## GOVERNMENT AUTHORITIES:

to evolve building norms and specify more low-carbon, circular and energy-efficient solutions in their projects and incentives, from infrastructure to buildings.



“We look forward to working with Holcim to create the next generation of sustainable building solutions.”

### MAYOR KATE GALLEGO

Phoenix, AZ, US, and Public Sector Co-Chair of the 50L Home Coalition

## ARCHITECTS AND ENGINEERS:

to specify low-carbon, circular and energy-efficient solutions in their design, in line with today’s sustainability certifications, from LEED® to BREEAM®.



“Holcim is doing an outstanding job to empower the architectural industry to shape a greener, better and more responsible future.”

### DIXON JUNLIANG LU

Head of US and Associate partner, MAD Architects

## CUSTOMERS:

to accelerate green demand by specifying low-carbon, circular and energy-efficient solutions in their procurement and building standards, helping them meet their sustainability goals.



“Holcim shares our commitment to a net-zero world and to accelerate environmental change.”

### GURMEET SETHI

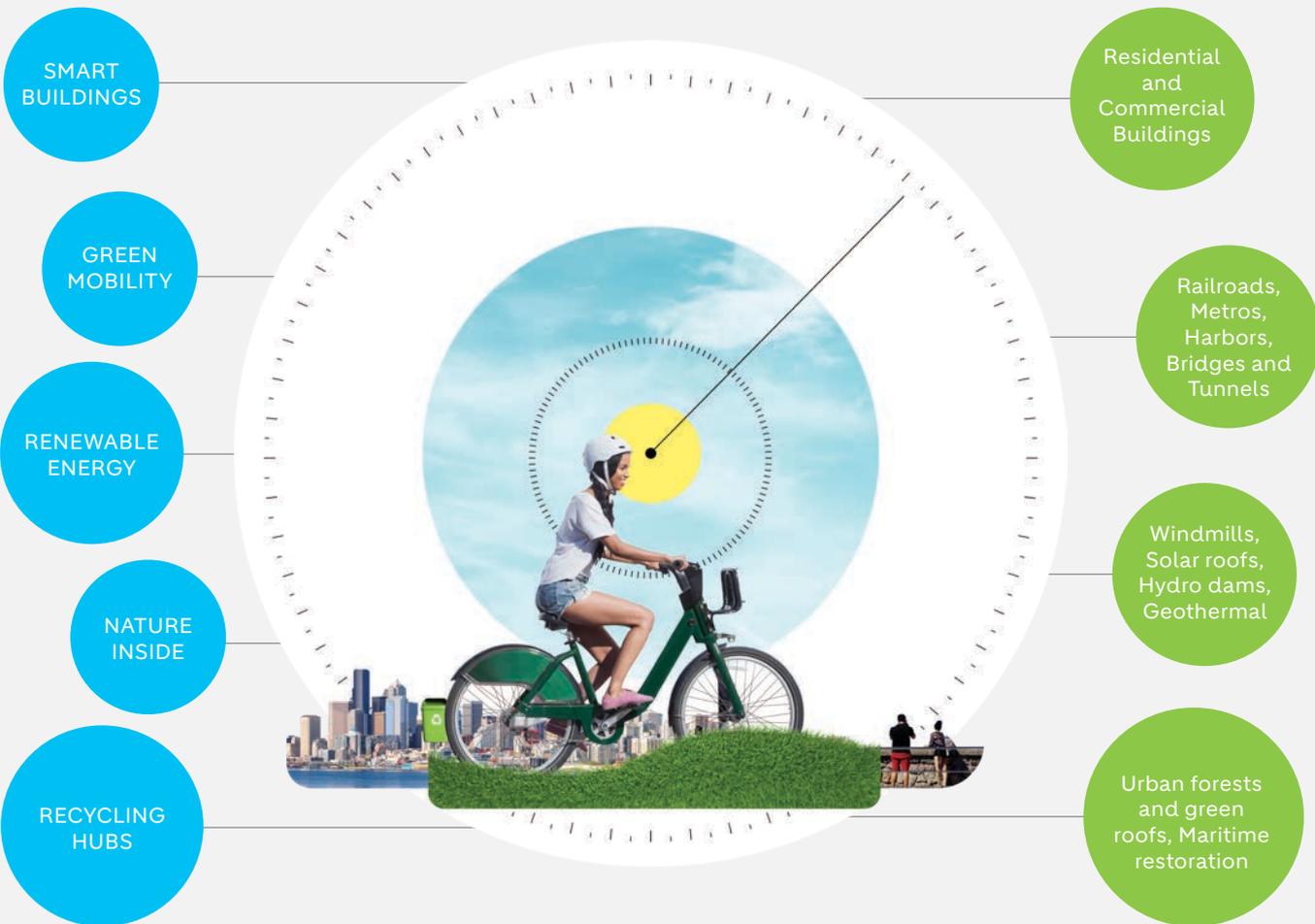
Head of AWS Data Center Procurement, Amazon

[+](#) Learn more on pages 56–57

## HOLCIM GREEN BUILDING SOLUTIONS APPLICATIONS FOR CIRCULAR CITIES

### WHAT MAKES A CITY CIRCULAR?

### APPLICATIONS



Holcim is deploying its green building solutions to fast track the shift toward more circular cities for a 1.5°C future: from enabling low carbon, circular and energy-efficient buildings, to empowering

green mobility and renewable energy infrastructure, all the way to recycling concrete with urban mining to build new from the old and bringing more nature into our cities. See how:

<p>Low-carbon materials and smart design to build better with less</p> <p><b>ECOPact</b></p> <p><b>TectorPrint</b></p>	<p>Global leader in recycling driving circular construction to build new from the old</p> <p><b>Susteno</b></p> <p><b>Aggneo</b></p>	<p>Energy efficiency and green retrofitting systems for more sustainable buildings in use: Roofing, insulation, facades, tiles and adhesives</p> <p> <b>ELEVATE</b></p> <p><b>AIRIUM</b> Insulation Redefined</p> <p> <b>SES</b> polyurethane systems</p>	<p>Nature-driven solutions to improve air quality, reduce urban heat and preserve biodiversity</p> <p><b>Hydromedia</b></p> <p><b>ELEVATE</b></p>
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# GREEN OPERATIONS

From energy and mobility to product formulation and next-generation technologies, we are lowering the carbon footprint of our operations.

## LOW CARBON FORMULATION

### ALTERNATIVE RAW MATERIALS

It is the production of clinker, the main component of cement, that produces the most CO<sub>2</sub> emissions. The majority of these emissions results from the chemical reaction that occurs when the raw material (limestone) calcinates into clinker during the production process.

This decarbonation process is our largest source of CO<sub>2</sub> emissions, accounting for 39 percent of our total carbon footprint. We use four major categories of alternative raw materials to reduce these emissions:

- Decarbonated materials reduce emissions in two ways: they emit less CO<sub>2</sub> and require less heat than conventional materials

- Basic components (Ca, Si, Fe, Al, S) enabling the supply of the essential minerals required for clinker chemistry and safeguarding quarry lifetime
- Recycled construction and demolition waste
- Historical waste from other industries, including fly ash and steel slag, replacing virgin limestone and avoiding landfill

We are working with innovative companies to keep raising standards and developing new alternative material streams.

## 100 percent recycled clinker

In January 2022, Holcim produced the world's first clinker made entirely of recycled minerals at its plant in Altkirch, France.

This marks a breakthrough in circular construction. It is the first step to an even bigger "first":

- Clinker is the primary component of cement, so this 100 percent recycled clinker will enable Holcim to produce the first 100 percent recycled cement.
- Cement is the primary manufactured component of concrete, so this cement will be used to produce the first 100 percent recycled concrete.

Clinker is the main ingredient in cement, produced by a tightly controlled industrial process that normally uses quarried limestone and other materials. The breakthrough trial in Altkirch used 100 percent recycled materials, ranging from construction and demolition waste, to wood ash, to waste from mineral processing, largely from local sources. Clinker mixed with additional constituents makes the gray cement powder that everybody knows. Clinker gives cement its most important property: compressive strength.

Producing fully recycled clinker is a major step in the shift to circular construction, and Holcim is leading the change.

# DECARBONIZING HOLCIM

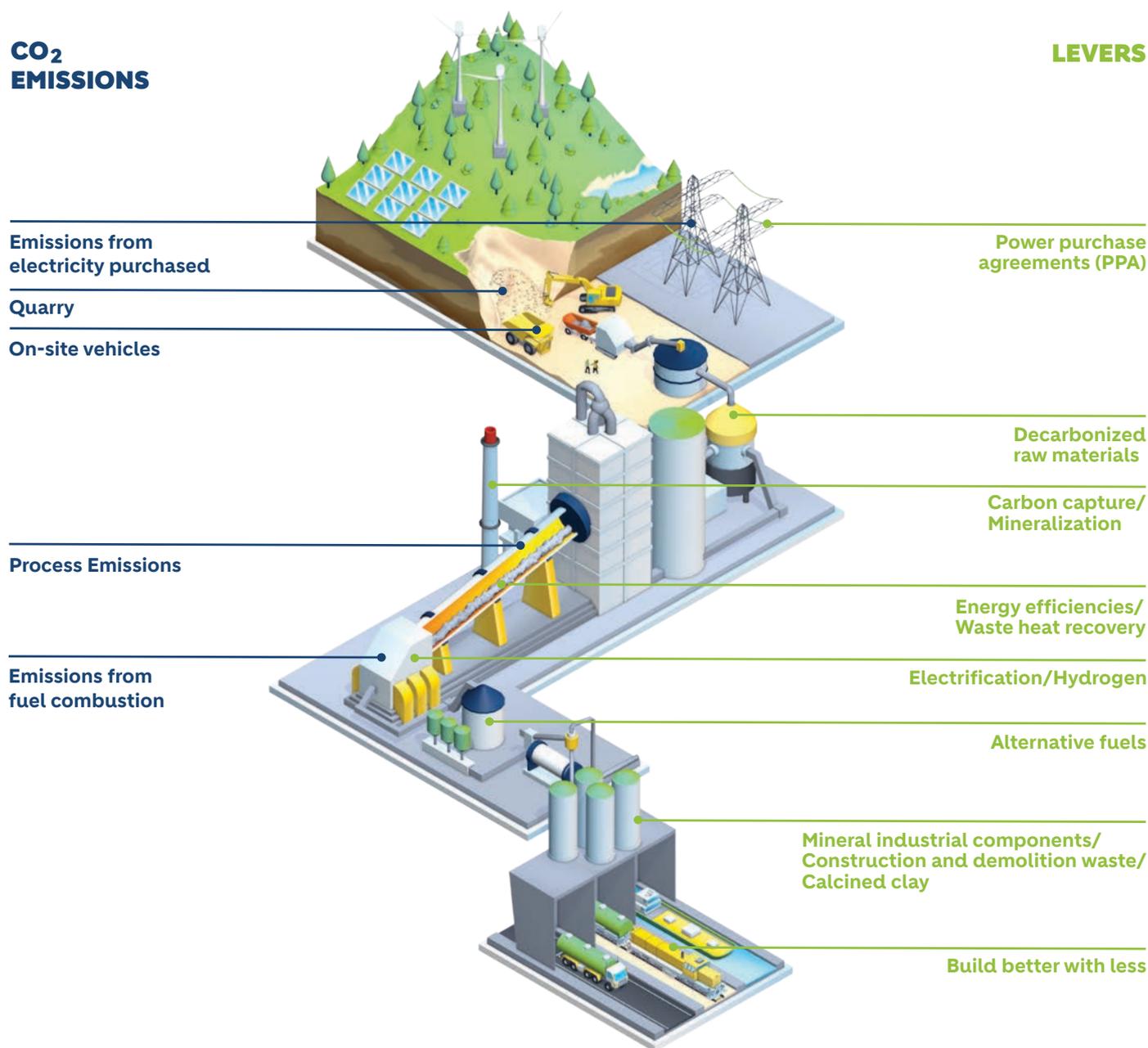
FROM OUR PRODUCTS TO OUR PROCESSES

1 2 3

This section covers Scope 1

## CO<sub>2</sub> EMISSIONS

## LEVERS



	Base Year <b>2018</b>	<b>2022</b>	Target <b>2025</b>	Target <b>2030</b>	Target <b>2050</b>
<b>SCOPE 1</b> KG CO <sub>2</sub> /net/T cementitious	<b>590</b>	<b>562</b>	<b>520</b>	<b>420</b>	
<b>SCOPE 2</b> KG CO <sub>2</sub> /net/T cementitious	<b>46</b>	<b>37</b>	—	<b>16</b>	

# GREEN OPERATIONS CONTINUED

## LOW CARBON FORMULATION CONTINUED

### MINERAL COMPONENTS

Replacing the clinker in our final cement products with alternative mineral components reduces the carbon intensity of the cement product. We aim to reduce our clinker content from 73 percent currently to below 68 percent by 2030, and reduce it further by 2050.

The main reduction will not only come from recycling construction and demolition waste and by-products from other industries, but also investing in calcined clay facilities and developing novel cements. In the coming decades we expect calcined clay and limestone to gradually replace traditional mineral components such as slag or fly ash.

**50%**  
Potential CO<sub>2</sub>  
reduction from  
calcined clay

**73%**  
Clinker factor in  
2022

## Building a low-carbon future with calcined clay

One of the ways we are decarbonizing cement is by increasing our use of innovative low-emission materials, such as calcined clay.

In March 2022, we received a strong vote of confidence from the French government, when it committed to financially support the implementation of our proprietary technology enabling low-carbon cement with up to 50 percent less carbon footprint using calcined clay. We are investing in plants in La Malle and Saint-Pierre-la-Cour to expand this sustainable solution.

Clay is naturally available worldwide, making it one of the most scalable solutions for delivering low-carbon cement globally. It is also a good

substitute for slag and fly ash, which are becoming more scarce, so that we can continue to produce low-carbon and high-performance cement. Developing such proprietary technologies is part of our plan to build a net-zero future.

Our calcined clay cement was first launched in the French market in July 2021 as part of our ECOPlanet range. Produced from locally sourced materials at the La Malle plant, this ECOPlanet variant emits 34 percent less CO<sub>2</sub> per ton of cement (compared to Ordinary Portland Cement). In March 2023, Holcim launched the first calcined clay cement production line in Europe at the Saint-Pierre-La-Cour plant in France. Using the proprietary technology ProximA Tech, the plant is designed to operate exclusively with alternative fuels and to produce cements with 50 percent lower CO<sub>2</sub>. We also sell calcined clay cements in Italy as part of our ECOPlanet portfolio, the world's broadest range of low-carbon cement.



◀ Exploring green formulation at the Holcim Innovation Center

# ENERGY

## THERMAL ENERGY AND ENERGY EFFICIENCY

1

2

3

This section covers  
Scope 1

### Energy efficiency

In 2022, Holcim launched its Global Power Program to involve everyone in finding efficiencies to reduce Scope 2 CO<sub>2</sub> emissions. The program has two pillars:

Pillar 1 included energy assessments which identified 709 projects with potential savings of 810,000 tons of CO<sub>2</sub>. By the end of 2022, 174 of these projects had been implemented with 263,000 tons of CO<sub>2</sub> saved. The other projects will be implemented in 2023 and 2024.

Pillar 2 engaged our workforce to discover energy-saving opportunities on their sites. They identified nearly 14,000 opportunities for a potential annual CO<sub>2</sub> savings of 140,000 tons. By the end of 2022, more than 5,000 opportunities had been implemented with 51,000 tons of CO<sub>2</sub> saved. The other opportunities are due to be implemented in 2023 and 2024.

We are modernizing our kilns to reduce CO<sub>2</sub> emissions. Through our "Plants of Tomorrow" program, we are going even further to create connected, smart and energy-efficient sites that use digital solutions to support other levers of decarbonization.

In 2022, Holcim in Belgium announced the GO4ZERO project to replace 2 existing wet kilns with one state-of-the-art dry process. The new kiln is expected to be around 40 percent more energy efficient.

+ More information is available in the section "Next-generation technologies", page 39.

### Alternative fuels

Providing waste management solutions in a future oriented way requires disruptive thinking, active engagement and collaboration. Through Geocycle, we rethink waste challenges to provide innovative ways to manage them. Our promise is clear: We work relentlessly to bring society a step closer to a zero-waste future.

We use alternative fuels, derived from waste including biomass residues, to replace traditional fossil fuels, including coal, petcoke, and natural gas. Waste volumes are increasing globally, and Geocycle offers highly safe and ecological waste solutions applying international standards. Taking a circular approach, we will reduce the carbon intensity of our cement by substituting fossil fuels with pretreated non-recyclable and biomass waste fuels to operate our cement kilns. In 2022, 28 percent of Holcim's thermal energy demand for clinker production came from alternative fuels.

To increase the use of alternative fuels we will be making further investments in co-processing facilities and process improvements. We aim to increase our thermal substitution rate to 50 percent by 2030 and reach a global performance of +70 percent by 2050.

# 28%

Share of thermal  
energy from  
alternative  
sources

# 5M

Tons of waste  
diverted from  
landfill



### DID YOU KNOW Our Egypt operations increase alternative fuels

We currently operate plants with virtually no traditional fossil fuels, such as Retznei in Austria operating with close to 100 percent alternative fuels. We are accelerating the use of alternative fuels, around the world. For instance, in Egypt, we already operate with 20 percent and are on our way to increase this in the near future. In Egypt, we are advancing the circular economy by increasing our use of alternative fuels derived from waste, by products and biomass.

# GREEN OPERATIONS CONTINUED

## ENERGY CONTINUED

### ELECTRICAL ENERGY



This section covers  
Scope 2



**27%**  
share of  
renewable  
electrical energy

◀ Elevate solar roof  
at Apple Park,  
Cupertino, USA

#### Solar power

Our efforts to maximize the use of green energy in our plants includes those we operate ourselves. At our Hagerstown plant in Maryland we are able to generate 10 MW saving the equivalent of over 12,000 tons of CO<sub>2</sub>. In addition, we continue to look for opportunities to partner with companies for the construction and operation of photovoltaic plants within our facilities.

#### Wind power

We will continue to expand our renewable energy portfolio by collaborating with power producers, generating wind energy on our land by installing wind farms. We install and operate wind farms ourselves such as at our Paulding plant in the US, where we've installed three wind turbines to supply clean wind power for the electric needs of our plant, eliminating the equivalent of 9,000 tons of CO<sub>2</sub> per year.

## Wind energy and circular economy in Germany

In 2021, our plants in Lägerdorf and Höver covered 10 percent of their electricity requirements from owned onshore wind power. In total, Holcim consumed 616 GWh of electricity in cement production in Germany in 2021. We have increased the use of renewable energy to 50 percent, saving more than 128,000 tons of CO<sub>2</sub> emissions.

At the end of their lifecycle (20-25 years), non-recyclable components of wind turbine blades have normally been landfilled. However, over the last decade, Holcim has pioneered co-processing at the Lägerdorf plant in northern Germany. The organic content of the blades has been recovered as thermal energy while the mineral fraction of the waste has been integrated as ash in the clinker the plant produces. This has helped reduce the carbon footprint of cement production and make it more resource efficient. One ton of blade waste reduces CO<sub>2</sub> emissions by 110 kg and saves 461 kg of raw materials.



#### DID YOU KNOW El Ronco photovoltaic park

In 2022, Holcim El Salvador signed an agreement for the construction of a photovoltaic park made up of 39,200 solar panels within the El Ronco plant, located in Metapán. From 2023, the company will have 17 MW peak of clean power, equivalent to 21 percent of the total required by the plant. This was made possible through a 15-year Power Purchase Agreement (PPA) with the company AES, which won the tender promoted by Holcim to install and subsequently operate the photovoltaic park.

## WASTE HEAT RECOVERY

We have waste heat recovery systems in place designed to use excess heat from cement kilns to generate electricity. We currently operate eight waste heat recovery units in four countries, with the plan to triple the number by 2030. In 2022, we produced 300 GWh of electricity from waste heat recovery, saving approximately 150,000 tons of CO<sub>2</sub>.

### Power purchase agreement

We will continue to expand our renewable energy portfolio by collaborating with off-site power producers. Off-site producers typically account for between 20 and 30 percent of the plants' consumption.

### Grid evolution

By 2050, the International Energy Agency (IEA) expects almost 90 percent of the world's electricity to come from renewable sources – with 70 percent from solar and wind. Concrete plays a key role in the energy transition and in accelerating the transition to renewable energy. Solutions like ECOPact provide safe, reliable, cost-effective and high-performance infrastructure, while working to extend the lifecycles of energy infrastructure from dams to wind farms. We need to generate a lot more renewable energy to meet the world's Consistency: net-zero goals.

## Holcim to reach 40% wind and solar in Texas

In the US, Holcim entered into its first virtual power purchase agreement (VPPA) linked to renewable energy generation. The Electric Reliability Council of Texas (ERCOT) VPPA means that at least 38 percent of our total power consumption at all of our production facilities in Texas is now from wind generation. The generation from this contract is equivalent to reducing 65,000 tons of CO<sub>2</sub> annually.

"Holcim US is driving forward momentum to meet our Green Growth Strategy goals by incorporating new technologies and processes at every level," said Atl Martinez, Vice President, Procurement.

**300 GWH**  
of electricity  
from waste heat  
recovery in 2022



### DID YOU KNOW Holcim enables low-carbon windfarms with ECOPact

Sabowind, a full-service supplier and operator of wind energy, used 4,200 m<sup>3</sup> of ECOPact concrete to build 13 wind turbine foundations for a new wind farm in Markowice, Poland. The wind farm will significantly boost clean energy production in north-central Poland. Thanks to ECOPact, Sabowind achieved an emissions reduction of 31 percent during the construction process. Upon completion, the Markowice wind farm will produce 300 GWh of electricity per year, supplying energy to around 75,000 households.



◀ By 2030 we plan to source 65 percent of our electricity from decarbonized sources like solar

# GREEN OPERATIONS CONTINUED

## HOLCIM'S VALUE CHAIN

Scope 3 emissions are all other indirect emissions associated with upstream and downstream activities of consolidated companies, as well as the direct emissions of our non-consolidated companies.

### Updated Scope 3 inventory

Until 2021, we focused on the most material Scope 3 categories, as recommended by the GCCA protocol for the cement industry.

In 2022 we updated our CO<sub>2</sub> inventory to include all categories of the Scope 3 Greenhouse Gas (GHG) protocol. Our Scope 3 accounting gives us a basis to mobilize our full organization, driving purchasing decisions to deliver on our decarbonization commitments. It also helps us engage other companies across the value chain in building a net-zero future. Our transparent, rigorous and science-based approach leads our industry, with the CDP recognizing Holcim as a Supplier Engagement Leader for the third consecutive year.

### Fuels and energy

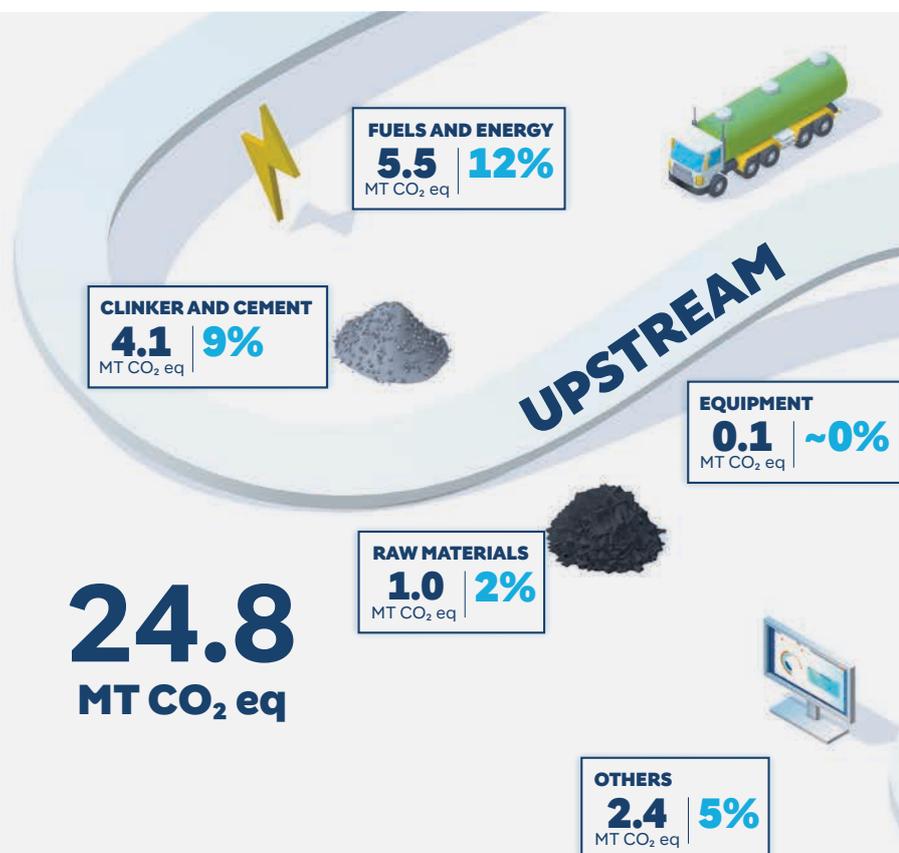
“Cradle-to-gate” emissions from purchased fuels and energy account for 12 percent of our total Scope 3 emissions. To reduce emissions in this category, we are replacing traditional fossil fuels with locally sourced, alternative and non-extractive fuels.

### Downstream transportation

The CO<sub>2</sub> emissions from transporting our materials to customers, between factories and distribution terminals, account for 13 percent of our total Scope 3 emissions. We are reducing these by optimizing routes and loads, moving volumes from road to waterways or rail and deploying fleets powered by electricity and more eco-friendly fuels.

### Purchased clinker and cement

Purchased clinker and cement account for 9 percent of our total Scope 3 emissions. We are introducing a requirement that our clinker and cement suppliers provide the CO<sub>2</sub> information related to their products, for example, through Environmental Product Declarations (EPDs), to accelerate the purchase of low-carbon products.



### Investments and joint ventures

As part of the extended inventory, we account for Scope 1 and 2 emissions from main investments and joint ventures in proportion to the share owned by Holcim.

### Other products and services purchased

All other products and services purchased account for approximately 19 percent of our total Scope 3 emissions. We expect reductions from including CO<sub>2</sub> requirements in the tendering process and integrating CO<sub>2</sub> as a parameter in the “Total Cost of Ownership” models used to drive purchasing decisions.

We also expect CO<sub>2</sub> reductions from innovation and partnerships with suppliers of global categories. For example, we piloted our industry’s first autonomous electric haulers in a quarry in Switzerland. This technology, which will eliminate the use of carbon intensive fuels to power heavy mobile equipment, will reduce CO<sub>2</sub> emissions in quarries by up to 85 percent.

**INBOUND TRANSPORTATION**  
**1.3** | **3%**  
 MT CO<sub>2</sub> eq

1 2 3

This section covers Scope 3

**CHEMICALS**  
**1.7** | **4%**  
 MT CO<sub>2</sub> eq

**EMMISSIONS FROM JVS AND NON-CONSOLIDATED COMPANIES (INVESTMENTS)**  
**22.5** | **47%**  
 MT CO<sub>2</sub> eq

**DOWNSTREAM TRANSPORTATION**  
**5.9** | **13%**  
 MT CO<sub>2</sub> eq

**22.5**  
 MT CO<sub>2</sub> eq

**PROCESSING OF SOLD PRODUCTS**  
**1.5** | **3%**  
 MT CO<sub>2</sub> eq

**DOWNSTREAM**

**END OF LIFE TREATMENT OF SOLD PRODUCTS**  
**1.0** | **2%**  
 MT CO<sub>2</sub> eq



**47.3**  
 MT CO<sub>2</sub> eq

# GREEN OPERATIONS CONTINUED

## HOLCIM'S VALUE CHAIN CONTINUED



◀ Hyliion electric trucks

### Deploying electric fleets

Holcim US has ordered 10 electric powertrain Hypertruck ERX trucks to replace existing diesel fuel vehicles in Texas and Oklahoma, as well as for the transport of roofing materials.

The Hypertruck ERX is recharged by an onboard natural gas generator for Class 8 commercial trucks that aims to provide lower operating costs, emissions reductions, and superior performance. Each Hyliion electric vehicle is estimated to reduce well-to-wheel greenhouse gas emissions by roughly 89 percent when using renewable natural gas (RNG).

# NEXT-GENERATION TECHNOLOGIES

HOLCIM IS EXPLORING A RANGE OF TECHNOLOGIES, INCLUDING CCUS

- 1
- 2
- 3

*This section covers Scopes 1, 2 and 3*

Next-generation technologies will drive an increasing share of our decarbonization efforts as we get closer to net-zero period.

## Hydrogen

We believe the hydrogen revolution will be paramount to accelerate the energy transition across several sectors.

At Holcim, we are assessing hydrogen's potential in two key applications. First, we are studying it as a clean alternative to fossil fuels in our transportation activities and kilns. And second, we are looking at how it can support our carbon capture, utilization and storage strategy of converting CO<sub>2</sub> into valuable products, such as with our Westküste100 project.

## Electrification

Process electrification not only removes dependency on fuels but is also an integrated carbon capture solution, and thereby a key to meeting our net zero targets.

We are scouting and validating technologies to shape our electrification portfolio. We are identifying and building collaborations with global renewable electricity producer leaders to secure required electricity supply for our projects.

ENERGY	FORMULATION	CCUS
Minimize CO <sub>2</sub> intensity of energy	Expand low-emission raw material use	Capture unabated CO <sub>2</sub> emissions
		

# GREEN OPERATIONS CONTINUED

## NEXT GENERATION TECHNOLOGIES CONTINUED

### Carbon capture utilization and storage

Next generation technologies such as carbon capture, utilization and storage (CCUS) will accelerate Holcim's decarbonization journey. CCUS technologies are an integral component of our decarbonization journey, and Holcim is actively working to integrate them throughout our business.

CCUS technologies separate and concentrate CO<sub>2</sub> released from industrial processes. They can facilitate safe storage underground, recycling for chemical and fuel applications, or capture and re-carbonation into concrete and mineral components.

Carbon capture is a proven solution in other industries. Nevertheless, CCUS needs to be further developed and integrated into the cement process because CO<sub>2</sub> is directly emitted in cement manufacturing from raw materials that cannot be replaced at scale.

We are actively exploring the potential of CCUS projects around the world. Our projects range from recycling CO<sub>2</sub> from our plants into low-emission raw materials for our low-carbon cement, all the way to using it as a greenhouse gas for farming or as a source for aviation fuel.

### Value Chain elements

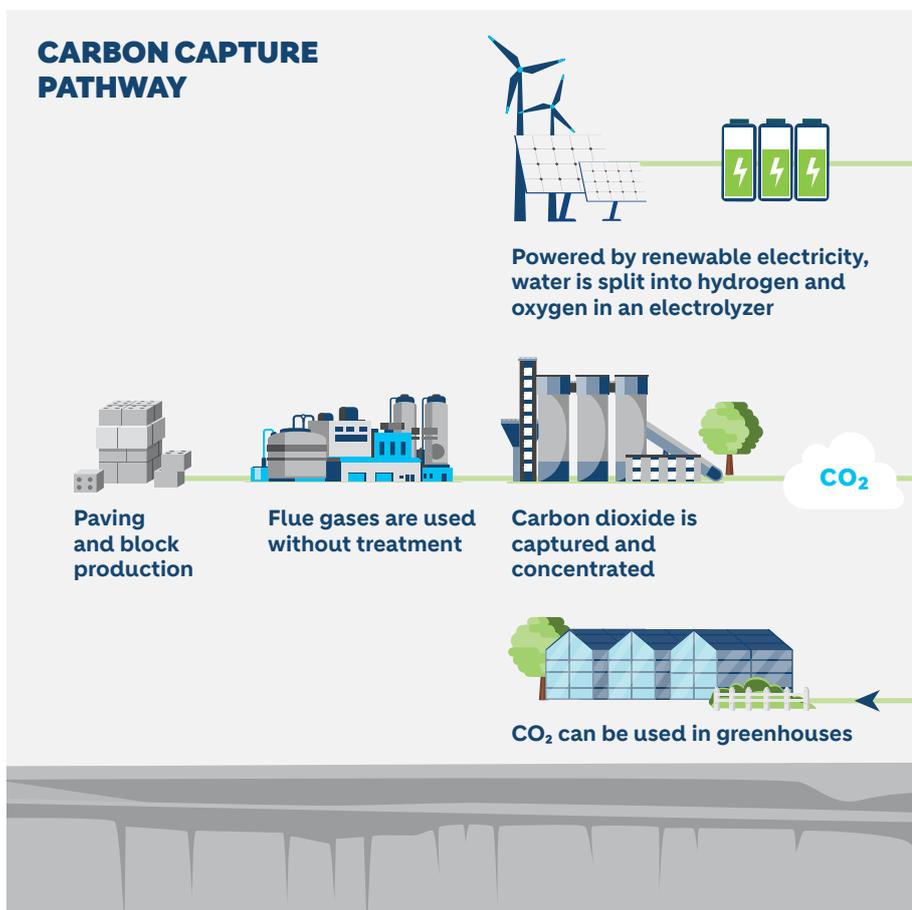
There is no "one-type-fits-all" CCUS solution, as the options for the capture, transport, utilization and storage of CO<sub>2</sub> vary from one site to another, and the regulatory environment varies from one country to another. Several factors impact the total value chain, such as utility (natural gas vs renewable power) availability, CO<sub>2</sub> transport infrastructure (pipelines, trains and shipping options), proximity to ports, availability of renewable power, existence of chemicals/plastics industry or other CO<sub>2</sub> emitting clusters, and feasibility of onshore vs offshore CO<sub>2</sub> storage. We are tailoring pathways and value chains based on local conditions.

### Capturing technologies

Capture technology makes up a significant portion of the CCUS value chain cost. We are developing or assessing a range of CCUS technologies to give us maximum flexibility across our global footprint and to reduce eventual capital investment requirements.

### Post-combustion technologies

These solutions capture CO<sub>2</sub> in the exhaust gas of a traditional kiln system at the "end of the pipe." The most advanced post-combustion solution is based on liquid solvents such as amines, e.g. monoethanolamine solution (MEA). The CO<sub>2</sub> in the exhaust gas is absorbed by the solvent, and the CO<sub>2</sub>-rich liquid is then sent to the regenerator where the CO<sub>2</sub> is released in a concentrated form. The solvent is reintroduced to the absorption column. Other post-combustion approaches include CO<sub>2</sub> separation by membranes and adsorption processes.



### Integrated processes

Integrated processes such as oxyfuel, the electrification of clinker manufacturing or the calcination of raw materials are possible alternatives to pure post-combustion capture. We are currently engaged in various site-specific investigations to develop integrated concepts. In the oxyfuel approach, air for combustion in the cement manufacturing process is replaced by oxygen to prevent nitrogen in the system and receive a concentrated CO<sub>2</sub> exhaust stream.

### Developing groundbreaking solutions via partnerships

Strategic partnerships are key to speeding up the deployment of CCUS. Working with other multinationals and start-ups in Europe and North America, our 50+ projects in CCUS and mineralization are evaluated in terms of cost, technical feasibility, compatibility with CO<sub>2</sub> utilization opportunities and other aspects of viability and scalability. From repurposing CO<sub>2</sub> from our plants for use in greenhouses in Spain all the way to alternative fuel in Germany, our objective is to develop different solutions for utilization and storage that can be combined in different ways and environments. We anticipate Holcim's current projects will require a cumulative CAPEX investment of circa CHF 2.0 billion by 2030 on top of expected public funding, with some

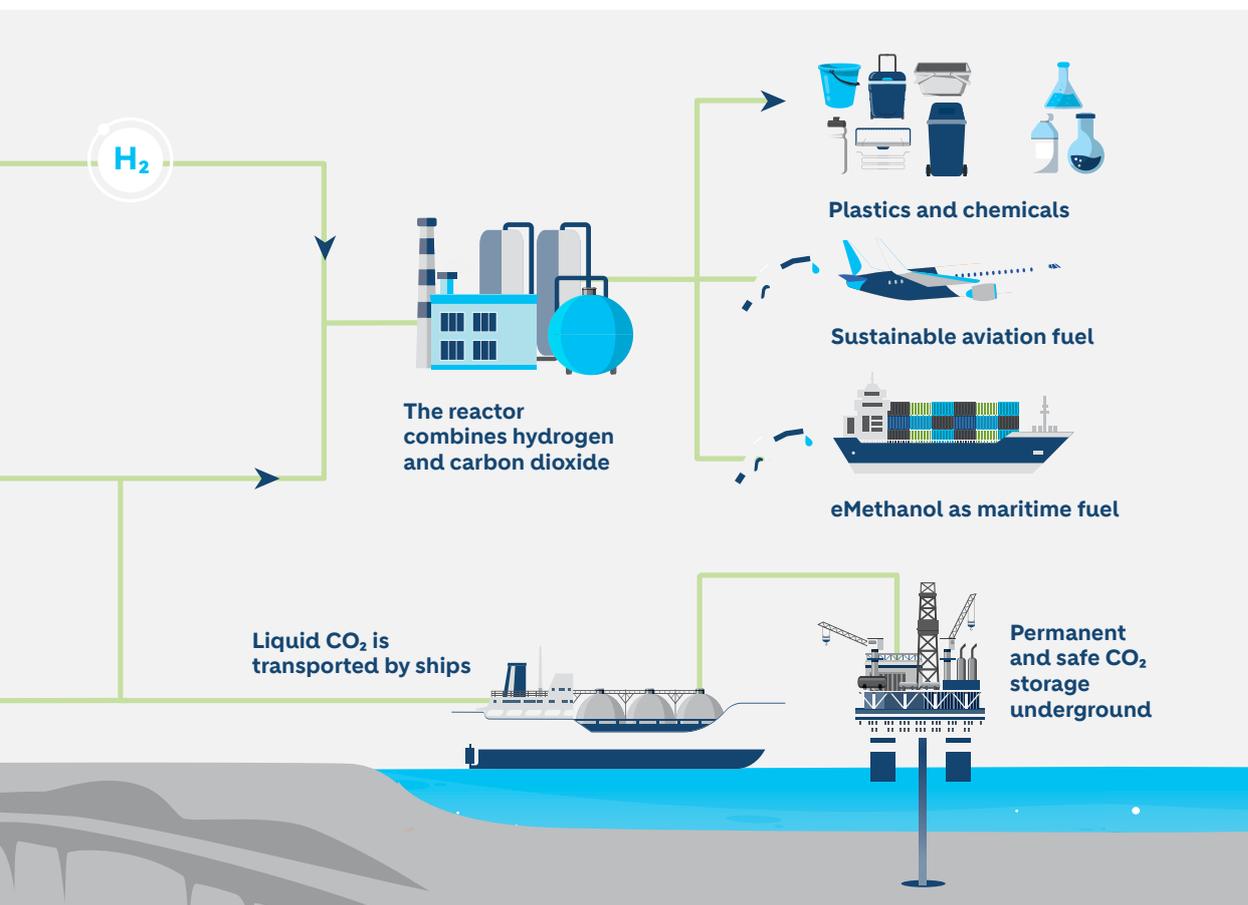
projects starting operation after 2030. These investments will enable Holcim to reach a total CO<sub>2</sub> capture capacity of more than 5 million tons per year before 2030.

**2.0BN**  
CCUS CAPEX  
excluding public  
funding by 2030  
Cumulative, CHF

### DID YOU KNOW EU support for CCUS at Holcim

In 2022, the European Union Innovation Fund awarded a total of EUR 338 million to accelerate the development of breakthrough CCUS projects in Germany and Poland.

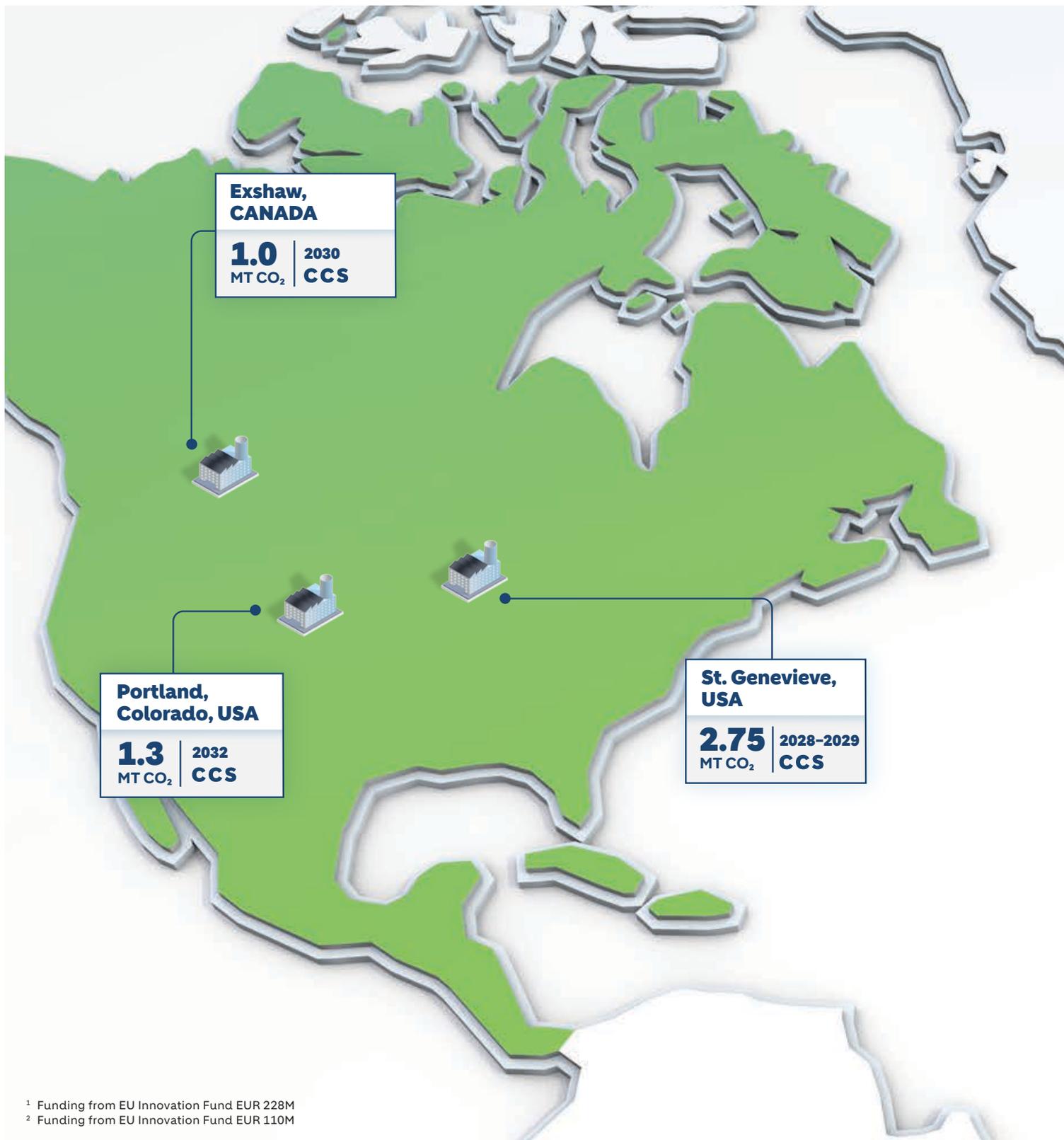
These projects are part of Holcim's net-zero roadmap, which includes over 50 CCUS projects worldwide, to decarbonize its business. The projects in Germany and Poland aim to contribute to the EU's Green Deal by putting clean technologies to work for a climate-neutral economy by 2050.



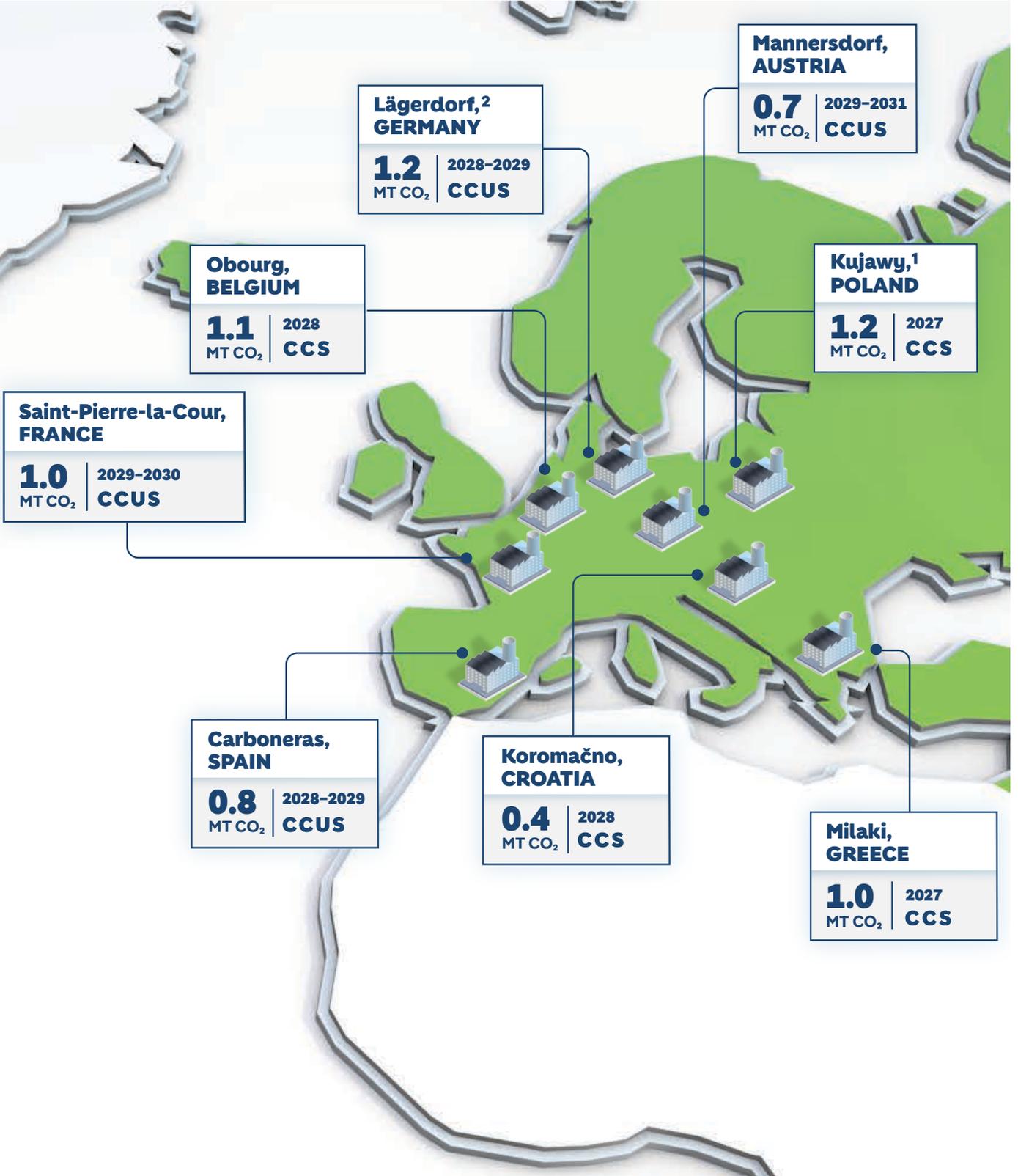
# GREEN OPERATIONS CONTINUED

## CARBON CAPTURE, UTILIZATION AND STORAGE

### FLAGSHIP PROJECTS



<sup>1</sup> Funding from EU Innovation Fund EUR 228M  
<sup>2</sup> Funding from EU Innovation Fund EUR 110M



# GREEN OPERATIONS CONTINUED

## NEXT GENERATION TECHNOLOGIES CONTINUED

### Kujawy

The EU is supporting Holcim's Go4ECOPlanet project in Poland, which aims to create an end-to-end CCS chain starting from CO<sub>2</sub> capture from its site in Kujawy to offshore storage in the North Sea. Our goal is for it to be a net-zero plant by 2027.

Thanks to Go4ECOPlanet project, Kujawy Cement Plant aims to become one of the first net-zero cement plants in the world.

The flue gas from the cement plant will be processed in a CO<sub>2</sub> capture plant which produces 99.9 percent pure CO<sub>2</sub> using Air Liquide's Cryocap™ FG technology. The installation will capture 100 percent of CO<sub>2</sub>

emissions from clinker production – the main ingredient of cement production. The capture facility is expected to capture over 10.2 million tons of CO<sub>2</sub> in ten years of operation and lower emissions from Poland's entire cement sector by 10 percent. The CO<sub>2</sub> will be transported from the plant by train to Gdansk, then by ship to the North Sea, where it will be stored in depleted oil and gas fields.

The project is aligned with the European Green Deal and related EU legislation to achieve climate neutrality by 2050. Other emitters from various industries can replicate the CCS solution implemented in the Kujawy region.

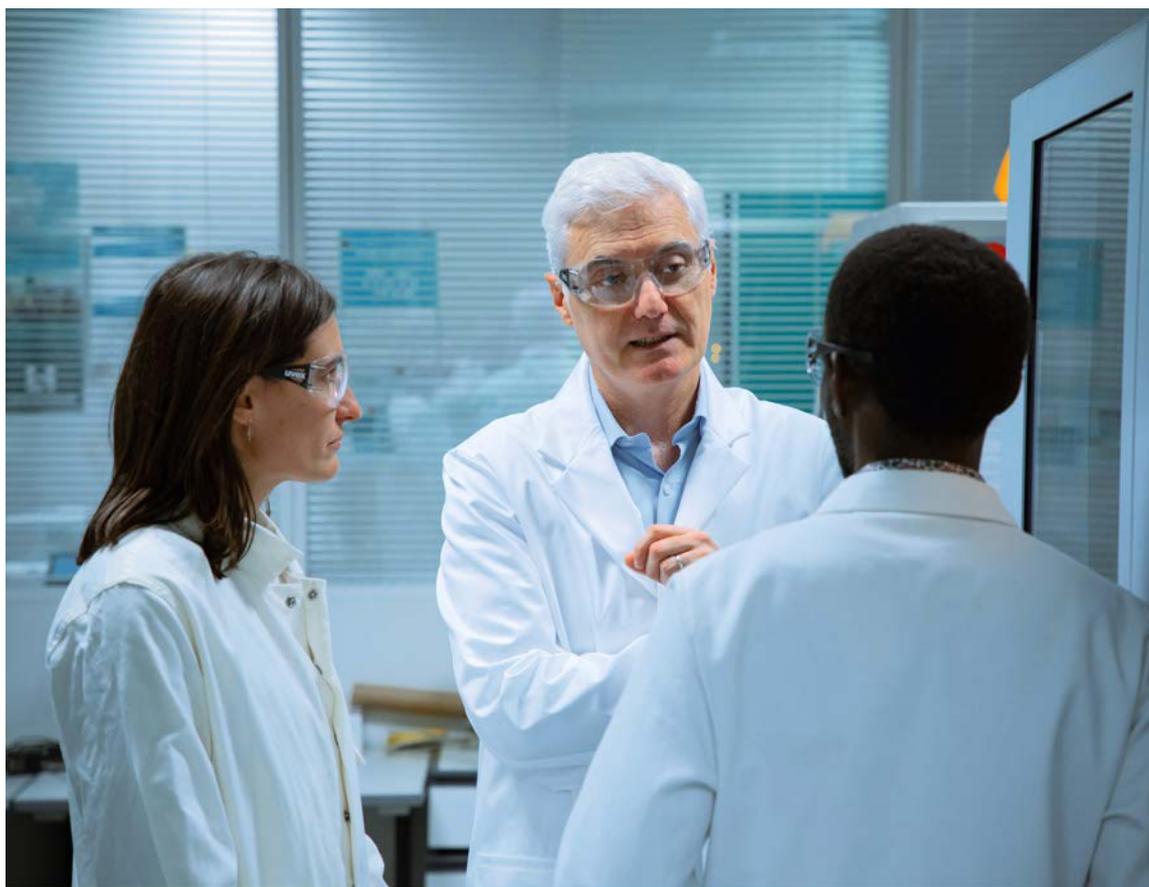
The Kujawy Go4ECOPlanet project was awarded an EU Innovation Fund grant for a total amount of EUR 228 million.

**228M**

**EU Innovation  
Fund grant  
EUR**

◀ R&D Center, Lyon





◀ R&D Center, Lyon

**110M**  
EU Innovation  
Fund grant  
EUR

## Westküste100

Holcim's Carbon2Business project aims to capture CO<sub>2</sub> from our plant at Lägerdorf and repurpose it as an industrial raw material, setting a new standard in low carbon cement production and industrial climate innovation. The EU Innovation Fund has awarded this innovative project a grant of EUR 110 million. The EU funds will be used to build a new kiln line that will create an industrial-scale prototype for decarbonizing cement production.

We are deploying a second-generation oxyfuel technology and a downstream compression and purification unit for the CO<sub>2</sub> as part of our Carbon2Business project. The project aims to capture over 1 million tons of CO<sub>2</sub> emitted annually, making Lägerdorf one of the world's few net-zero CO<sub>2</sub> cement plants by the end of this decade. The technology will be the first-of-its-kind application in the cement sector. Almost all of the unavoidable process-related CO<sub>2</sub> emitted during cement clinker production can be made available as a resource, for example for further processing into methanol.

Carbon2Business will be able to scale up the work carried out at the real life laboratory of Westküste100, a cross-sector partnership with the aim of producing green hydrogen from

offshore wind energy and using the waste heat generated in the process. This large-scale industrial solution will support the formation of a hydrogen hub in northern Germany as well as in other regions in Europe.

Lägerdorf's unique location on the west coast of Schleswig-Holstein provides favorable conditions for just such a project. Here, a strong wind energy region and excellent geological conditions meet innovative companies that want to actively shape the future and make an important contribution to achieving climate targets.

With Carbon2Business, Holcim is making a significant contribution to several EU policy objectives, such as the transition to a climate-neutral economy by 2050 within the overall framework of the European Green Deal.



# BUILDING BETTER WITH LESS

As part of our commitment to decarbonizing building, we are developing the most advanced low-carbon products and solutions to build better with less.



◀ Residential development in Monterrey, Mexico with ECOPact low-carbon concrete

## ECOPact saves 30% CO<sub>2</sub> in Mexico

GP Vivienda, one of Mexico’s biggest real estate developers and construction companies, used 50,000 m<sup>3</sup> of ECOPact low carbon concrete to build twelve residential developments all across the Monterrey metropolitan area. GP Vivienda achieved a CO<sub>2</sub> emissions reduction of 30 percent by using ECOPact, saving 3.8 tons of CO<sub>2</sub> in comparison to a reference concrete mix with Ordinary Portland Cement. This is equivalent to the energy use of 380 homes in a year, energy use for an entire year, or more than 15,000 kilometers traveled by car. Upon completion, the project will provide 2,200 homes to the residents of Monterrey.

Villas Regina and Villas Buenavista will provide affordable housing for 950 families, as well as public green spaces to come together as a community. Montenova Residencial and Kebana Residencial will offer more upscale homes for an additional 230 families.

**“We want to be the leaders in sustainable construction in Mexico, and Holcim’s range of low-carbon products is helping us on our journey.”**

**DUBELSA RODRIGUEZ**  
Architect at GP Vivienda



◀ Global product campaign: ECOPact – the world's broadest range of low-carbon concrete

**13%**  
of ready-mix sales from ECOPact

**ECOPact**

**ECOPlanet**

**Malarkey**  
Roofing Products



### **DID YOU KNOW** Concrete: the material for a net-zero future

**Versatile:** Concrete opens infinite possibilities with its design flexibility. Known as liquid rock, it is the only building material that goes from liquid to solid, taking any shape. This makes it the ideal material to make everything from high-rise buildings and infrastructure to affordable housing, from 3D printing to high-strength prefabricated structures.

**Sustainable:** Concrete is local, affordable, enhances a building's energy-efficiency with its thermal properties and can be low-carbon by design. We are decarbonizing it with our ECOPact low-carbon concrete and leveraging its thermal properties for energy efficiency. Acting as a carbon sink, concrete can reabsorb more than 20 percent of the CO<sub>2</sub> emitted in its production throughout its lifespan in the right conditions.

**Recyclable:** Concrete is infinitely recyclable, just like glass. We are driving circular construction across our markets, developing concrete recycling infrastructure to expand urban mining to build new from the old. We will recycle 10 million tons of construction and demolition waste per year by 2030.

**High-performing and resilient:** Reinforced concrete protects our homes, cities and infrastructure like no other material, resisting disasters, from fires and floods to earthquakes and hurricanes.

### **ECOPact**

ECOPact is the world's broadest range of low-carbon concrete, delivering 100 percent performance with at least 30 percent lower carbon emissions compared to the standard (CEM I) concrete in its respective country.

ECOPact is a concrete solution of innovative design, developed through extensive research and testing.

It contains an innovative mix of supplementary cementitious materials and admixture technology. When permitted by regulations, ECOPact+ concrete integrates recycled construction and demolition waste, further closing the resource loop.

In 2022, we accelerated the global roll out of ECOPact to 29 markets, where it accounted for 13 percent of our total ready-mix net sales.

### **Environmental performance: verified**

To demonstrate the environmental profile of our solutions in a transparent way, there are markets where we provide information on CO<sub>2</sub> savings related to environmental product declarations (EPDs) verified by independent third parties. In the US, for example, our OneCem and ECOPact low carbon solutions are all backed with EPDs. All our countries are now building their EPD roadmap so that our customers can generate EPDs on demand, with plant- and product-specific data, to verify their low-carbon benefits. We offered 1,840 EPDs as of the end of 2022.

# BUILDING BETTER WITH LESS CONTINUED



## DID YOU KNOW Agrovia improves rural roads while reducing environmental impact

Agrovia is a specially developed hydraulic binder for stabilization of soils and rural roads. It is part of the ECOPlanet range. Combining cement with locally sourced soils, Agrovia improves rural roads while reducing environmental impact.

Agrovia has a lower carbon footprint than other binders because it eliminates the CO<sub>2</sub> emissions generated by the transport of raw material. Better rural roads mean higher rural incomes because producers have better market connections and less of their agricultural goods are damaged in transit.

## Zephyr Ost sustainable construction

Zephyr Ost is Switzerland's largest construction project using climate-friendly concrete. The project uses ECOPactRECARB, which uses re-carbonated aggregates and our resource-saving cement, Susteno. It captures CO<sub>2</sub> and stores it permanently and safely in demolished concrete to pave the way towards net-zero.

The RECARB solution takes the CO<sub>2</sub> from a wastewater treatment plant and stores it permanently in the aggregates. This project used 4,200 m<sup>3</sup> of our ECOPactRECARB, which saved in total 71 tons of CO<sub>2</sub>: 50 tons by using Susteno cement and 21 tons from recarbonating the construction and demolition waste.



### ECOPlanet

ECOPlanet is our global range of low-carbon cement, delivering at least 30 percent lower carbon footprint with equal to superior performance. ECOPlanet's sustainability profile is driven by innovative low-emission raw materials, including calcined clay and recycled construction and demolition waste. Its lower carbon footprint is further enhanced by a decarbonized production process using alternative fuels.

ECOPlanet has now been launched in 27 markets. In Latin America ECOPlanet now represents 60 percent of net sales.

### Re-carbonated aggregates

Construction and demolition waste can be used to create new low-carbon building materials – particularly for aggregates, a key ingredient of concrete. However, this recycled rubble is sometimes more porous. To overcome this limitation, Holcim is adding CO<sub>2</sub> from our own industrial processes to the reused concrete. This effectively seals the aggregate, reducing the porosity and required cement while increasing versatility. It also permanently sequesters CO<sub>2</sub>.

### Malarkey roof shingles

We strive to make our Malarkey roof shingles the best shingles manufactured in the most sustainable way. In the Environmental Product Declaration (EPD) compiled by the Asphalt Roofing Manufacturers Association (ARMA), Malarkey shingles were shown to have up to 26 percent less carbon content than standard shingles. We invented the cleaner, longer-lasting shingle technology known as polymer modified (rubberized) asphalt and pioneered the use of upcycled rubber in shingles. In 2018, we launched the industry's first smog-reducing shingle, equivalent to planting 1 million trees over the past four years.

Sustainability impact of Malarkey shingles for an average roof

Shingle lines	Highlander™ NEX Highlander™ NEX AR	Vista Vista AR	Legacy Legacy Scotchgard
Upcycled rubber tires	4	5	6
Upcycled plastic bags	2.9K	3.2K	4.0K
Carbon reduction	20–60%	19–20%	4–8%



◀ Al-Ain Sokhna Port in Egypt with ECOPlanet low-carbon cement

## ECOPlanet in Egyptian port with 45% less CO<sub>2</sub>

The extension of the Al-Ain El-Sokhna Port in Egypt used ECOPlanet low carbon cement. The highly demanding infrastructure project has already reduced CO<sub>2</sub> emissions by 45 percent thanks to our low-carbon cement.

In Egypt, we supplied 85,000 tons of ECOPlanet, for the construction of 28 kilometers of quays, requiring more than 2 million m<sup>3</sup> of concrete. Using ECOPlanet saved almost 40,000 tons of CO<sub>2</sub> compared to standard cement for an emissions reduction of 45 percent.

Upon completion, the port will have four new docks and berths with a length of 18 kilometers and a depth of 18 meters, as well as trading yards with an area of 9.6 km<sup>2</sup>. Commercial and logistics areas cover an area of 5.3 km<sup>2</sup>.

**“Holcim’s ECOPlanet helps accelerate the transition to greener construction, making our society more environmentally friendly.”**

**AMR SALAHSALEH**

Chairman and CEO, Modern Structures and Equipment Co.

# BUILDING BETTER WITH LESS CONTINUED

## DYNAMax

DYNAMax is the ultimate performance concrete, characterized by high strength, outstanding durability and superior rigidity.

DYNAMax can also reduce the overall carbon footprint of a project due to reduced material demand, as it has for a new office quarter in Wiesbaden, Germany. The project envisions a 14-story high-rise building, a seven-storey base building and a landscaped inner courtyard as well as a large green promenade open to the public. The vision relies on slender supports that maximize the buildings' usable area – but it takes innovative materials like DYNAMax to build them safely.

Holcim produced the concrete for this project at its plant in Mainz-Mombach, which offers Concrete Sustainability Council (CSC) certification to assure all stakeholders that the concrete is ecologically, socially and economically responsible across its entire supply chain. This CSC-certified concrete was then used to create the supports for the Wiesbaden project from the ground floor to the fourth floor, keeping component cross-sections as small as possible. Polypropylene (PP) fibers were added to the concrete for an extra level of fire resistance.

The developers have already received platinum pre-certification from the German Sustainable Building Council (DGNB – Deutsche Gesellschaft für Nachhaltiges Bauen e.V.) for the project, to be completed by Spring 2024.

Choosing sustainable materials like CSC-certified DYNAMax made a significant contribution to the DGNB's decision to pre-certify the project.

At Holcim we are building better with less to decarbonize construction. We combine low-carbon building solutions with smart design to use less material per square meter of building or infrastructure, translating into lower embodied carbon compared to conventional materials. For example, 3D printing uses up to 50 percent less materials with no compromise in performance.



◀ Carbon prestressed concrete, reinforced with prestressed carbon fibers

## Carbon prestressed concrete (CPC)

Holcim's low-carbon materials help decarbonize construction so that the world builds better with less using smart design. Thin precast carbon prestressed concrete (CPC) slabs are one of our latest solutions. CPC's extraordinary potential to industrialize construction while driving low-carbon and circular building has made it the winner of the Bauma Innovation Award 2022 in the "Construction" category.

CPC is fully recyclable and reduces material use by up to 80 percent. It reduces CO<sub>2</sub> emissions by up to 75 percent and weighs significantly less than timber.

## 3D printed housing project in Kilifi, Kenya

At the end of 2021, Holcim launched Africa's largest 3D-printed housing project in Kilifi, Kenya, developed by 14Trees, our joint venture with British International Investment. Building on our experience supporting the world-first 3D-printed school in Malawi, the planned 52-unit Mvule Gardens housing complex will be built in a number of phases. In Phase 1, 14Trees completed the 3D printing of the walls of 10

houses in January 2023 after just 10 weeks using only one printer.

The project demonstrates how rapidly 3D printing can accelerate construction of affordable housing. This is especially urgent in countries such as Kenya, which faces an estimated shortage of 2 million houses. The project's sustainability profile was also awarded an EDGE Advanced Sustainable Design certification by IFC, the World Bank's development finance institution, which recognizes resource-efficient buildings with the potential to be zero-carbon. It is the first time a 3D-printed housing project has attained this certification.



◀ The Mvule Gardens housing complex in Kenya, 3D-printed with Holcim's proprietary ink, TectorPrint

### DID YOU KNOW COBOD International

In 2022 we became an investor in COBOD International, a global leader in 3D construction printing, to advance world-class 3D printing materials, robotics and automation. Building on a collaboration started in 2019, we are working with COBOD to further advance our innovative range of proprietary 3D printing ink, TectorPrint.

Holcim and COBOD have successfully collaborated on a range of innovative building projects, from 3D-printed windmill tower bases with GE, to the world's first 3D-printed school in Malawi and the largest 3D-printed affordable housing project in Kenya.



# MAKING BUILDINGS SUSTAINABLE IN USE

Seventy percent of the CO<sub>2</sub> emissions in the construction sector are generated by buildings in use. We're expanding our solutions, from roofing and insulation to advanced mortars and green retrofitting, to reduce this footprint.

## Energy efficiency

Holcim's brand portfolio includes a wide range of products and green building solutions to enhance energy efficiency.

We've made a fast expansion into roofing, which plays a crucial role in energy efficiency. With solutions ranging from Elevate's green, cool and solar-enabling flat roof systems, all the way to Malarkey's residential shingles, we are becoming an industry leader in this area. In 2022 we crossed a milestone by transitioning all of Elevate's insulation board production facilities to ISOGARD™, meaning that all of them now provide maximum thermal efficiency for lower operational emissions (see box).

One of our newest brands, SES Foam, is the largest independent spray foam insulation company in the US. SES develops advanced products such as its SucraSeal bio-based spray foam insulation, designed to improve a building's energy efficiency and thermal comfort while lowering its carbon footprint.

Our innovative Airium™ insulating system increases a building's energy efficiency and can even be applied in green retrofitting applications to expand a building's lifespan. Airium™ is mineral-based. As such, it is a fully recyclable foam that does not release any volatile organic compounds, thus enhancing indoor air quality. Airium™ offers excellent durability, fire resistance and a low CO<sub>2</sub> footprint. Applied as a semi-liquid foam, Airium™ can fit into any shape or corner. It then hardens to create a powerful, light, long-lasting and fully recyclable insulating solution.

PRB Group, France's largest independent manufacturer of specialty building solutions, completes our insulation portfolio, offering coatings, insulation, adhesives and flooring systems.

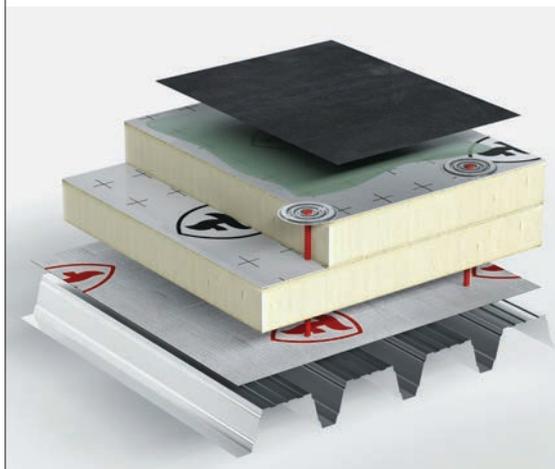
## Bringing nature into cities

In addition to reducing the operational emissions of buildings, our products bring more nature into cities, making them more livable. For example our green roofs bring vegetation and nature into cities, reducing the urban heat island effect and improving air quality.

Hydromedia permeable concrete recharges groundwater, allowing urban forests to grow and limiting the impact of heavy floods.

### DID YOU KNOW Why ISOGARD™?

Roof insulation acts as a barrier to heat loss and gain, improving a building's overall energy efficiency. In the US, Elevate ISOGARD™ technology provides 40% better thermal performance compared to leading competitive products on the market today.





◀ *Thermal Concrete Activation in Austria that intelligently stores thermal energy to to heat and cool buildings as needed*

## Heating and cooling buildings with Thermal Concrete Activation

Using renewable energy often means relying on sun and wind. But there's no sun at night and the wind does not always blow, which means that they do not meet the energy needs of buildings at all times. Switching to 100 percent renewables will therefore require effective energy storage. A Thermal Concrete Activation (TCA) system is a highly effective solution to achieve that.

TCA systems are simple and cheap to implement. We already know concrete is the world's building material of choice. It turns out that concrete is also excellent at storing and conducting heat. Concrete load-bearing components can play this additional role if they are designed intelligently to store thermal energy. During the construction of a building, pipes can be introduced into large-scale concrete components, such as ceilings and floor slabs, through which warm or cool water is routed as required. The system basically pre-charges buildings with energy that can be stored and released for heating and cooling as

needed, covering their energy needs at all times. In practice, combining renewable energy with a cheap storage solution drastically reduces energy consumption and costs for the residents. Best of all, this solution is highly scalable: in terms of supply chain, handling and construction, few materials are likely to be as cost effective, easy to obtain and simple to use as concrete.

TCA is a mature and well proven technology. In Austria, for example, the residential (multi-floor) MGG project uses a TCA system to absorb and store excess production of renewable solar and wind energy in combination with geothermal energy. This results in very low energy costs for heating and cooling, representing only — EUR 2–3/m<sup>2</sup> per year, optimizing renewable energy use in a highly affordable way. The system operates at low temperature and the heating and cooling is done via radiation, offering a high living comfort for the users and a very stable and comfortable room climate, remaining within a stable 20–25°C throughout the year.

TCA can play a major role in the decarbonization of cities. Energy efficient, environmentally friendly and cheap, it can effectively accelerate the phase out of fossil fuels in the built environment, reduce energy costs for households and contribute to housing affordability.

### MAKING BUILDINGS SUSTAINABLE IN USE WITH OUR RANGE OF SOLUTIONS & PRODUCTS

#### ROOFING AND INSULATION



#### SPECIALTY BUILDING SOLUTIONS



# MAKING BUILDINGS SUSTAINABLE IN USE CONTINUED

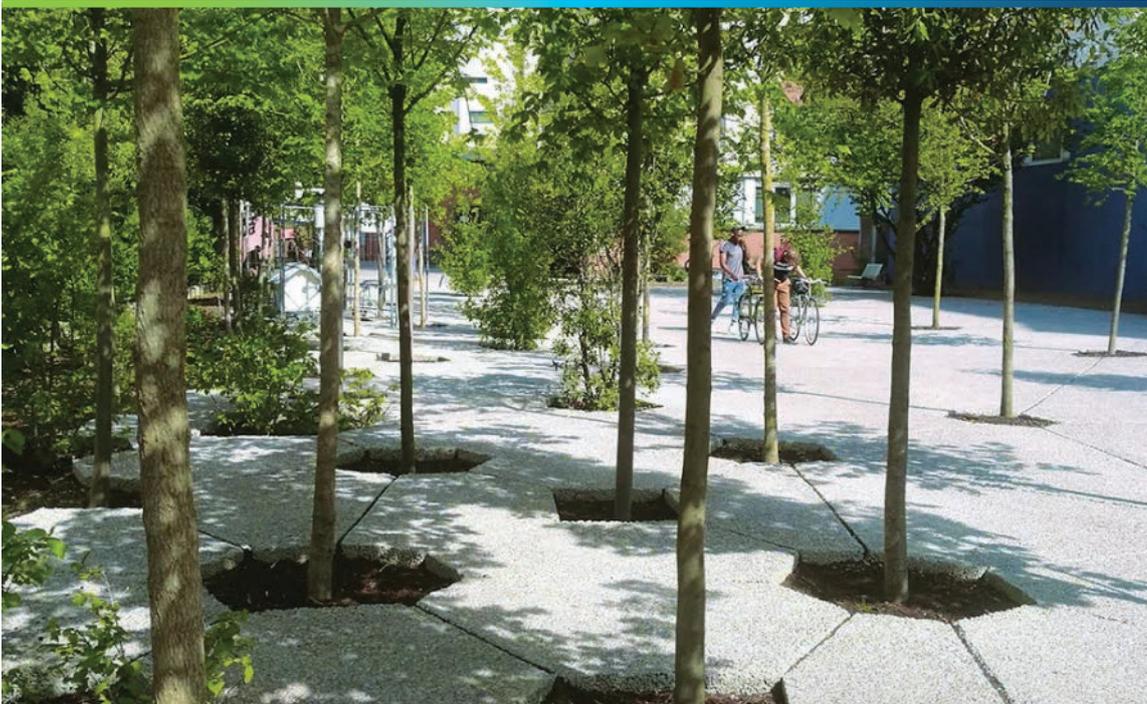
## Hydromedia New Air

Hydromedia is a water management system that rapidly absorbs rain water from streets, parking surfaces, driveways and walkways. This helps to prevent flooding, guaranteeing a drainage capacity on the order of 500–600 liters per square meter per minute. Hydromedia is 100 percent recyclable, low maintenance and easy to place.

Hydromedia New Air combines these advantages with patented activated charcoal, acting as a filter to remove pollutants such as nitrogen oxide and fine particulates.

Air pollution is a key challenge worldwide, and urban environments often suffer the most. Hydromedia New Air can mitigate this problem while improving water management and reducing the urban heat island effect.

The technology has been tested and proven effective in lab, parking lot and tunnel demonstrations.



◀ Urban forest near Paris, France with Hydromedia permeable concrete



◀ Thammasat University Rooftop Farm (TURF), Asia's largest rooftop farm with Firestone's UltraPly TPO 1.5mm-20,000m<sup>2</sup> green roof in Thailand

## Elevate enables Asia's largest rooftop farm

Climate change and urbanization call for new solutions to maintain and improve the quality of life in our cities. Green roofs are one of the answers because they can mitigate the heat island effects in cities. Elevate brings greenery back into cities with its range of roofing solutions that enable green roofs.

One great example is 40 kilometers from Bangkok, Thailand, at Thammasat University. As the largest urban rooftop farm in Asia, the 22,000-square-meter Thammasat University Green Roof incorporates modern landscape architecture with agricultural ingenuity, inspired by traditional rice terraces of Northern Thailand.

The cascading farm levels allow rainwater to be absorbed and stored to grow crops. The green roof also filters rainwater naturally through

several layers of plants and soil before it leaves the site and reaches residential water sources and marine ecosystems.

The roof is a green public space, urban organic farm and outdoor classroom all in one. It is enabled by UltraPly TPO thermoplastic membrane, which is resistant to roots and offers excellent weathering performance. Its ability to withstand extreme temperature conditions makes it a very durable waterproofing solution.

Holcim is putting its sustainable building solutions to work to enable green cities around the world from foundation to rooftop.

# HELPING OUR CUSTOMERS MEET THEIR SUSTAINABILITY GOALS

Our sustainable building solutions help lower our customers' Scope 3 emissions.

## Cross-selling for green growth

By combining Holcim green solutions such as ECOPact low-carbon concrete and Elevate energy efficient roofing systems, we offer a full-system approach to decarbonize our customers' buildings, from foundation to rooftop.

At Amazon's distribution center in Maple Grove, Minnesota, for example, we delivered 100,000 m<sup>2</sup> of roofing solutions as well as 100,000 m<sup>3</sup> of concrete. Our broad offer across materials and solutions puts us in a strong position to reach specifiers with our differentiated and sustainable solutions, particularly for warehouses and big data projects such as the one in Maple Grove. Such projects account for a rapidly growing share of building across our markets.

This builds on a legacy of collaboration between the two companies, such as at Amazon's iconic headquarters in Seattle (below), where ECOPlanet delivered an 80 percent CO<sub>2</sub> reduction.

**“Holcim allows AWS to further reduce the emissions associated with building our data centers, and creates opportunities to make our infrastructure more sustainable going forward.”**

**GURMEET SETHI**

Head of AWS Data Center Procurement for the Americas

### GREEN BUILDING SOLUTIONS

 ELEVATE

+

 ECOPact

+

 ECOPlanet



◀ Amazon's iconic headquarters in Seattle, where ECOPlanet delivered an 80 percent CO<sub>2</sub> reduction



## Amazon builds low-carbon with Holcim

Holcim and Amazon Web Services (AWS) are working together to make AWS data centers in the US more sustainable. The partnership follows AWS's new design standards, which requires that its new US data centers use concrete with 20 percent lower embodied carbon versus standard concrete. Holcim delivered a tailor-made ECOPact mix that nearly doubled that goal, decreasing embodied carbon by nearly 40 percent.

"New ideas, new technologies and new requirements are changing the ways we design, build and grow," said Cedric Barthelemy, Regional Head, Mid-Atlantic with Holcim. "AWS is known for its bold thinking across business models, and that extends to its approach to sustainability. Our partnership pairs their experience in data warehousing and our expertise in designing low-carbon concrete to achieve a more sustainable built environment."

As innovation leaders of their respective industries, Holcim and AWS prioritized the collaboration of engineers, architects, developers and builders early in the planning to achieve such a steep CO<sub>2</sub> reduction with ECOPact in its new data centers.

Holcim and AWS are looking for ways to improve CO<sub>2</sub> savings on future projects, especially as the new AWS design standards go global.

**"Amazon gave us a target for decarbonization – then we doubled it with ECOPact."**

**CEDRIC BARTHELEMY**  
Regional Head, Mid-Atlantic



# CIRCULAR CONSTRUCTION

At Holcim we see circularity as the business opportunity of our time.

Circular construction is at the core of decarbonizing building, from recycling materials to build new from old, to reducing the footprint of buildings with low carbon solutions, all the way to regenerating ecosystems, bringing more nature into cities. Concrete is a material of choice for circular construction as it is infinitely recyclable. Holcim is scaling up its range of circular material solutions based on urban mining.

We recycled 34 million tons of materials across our business in 2022, making us one of the world's largest recyclers.

### Construction and demolition waste

Construction and demolition waste (CDW) can be used to create new, low-carbon building materials. While porous rubble is typically used in road sub-base applications, our innovation teams are advancing ways to produce concrete using 100 percent recarbonated, recycled rubble. These advances are putting Holcim at the leading edge of the industry as we move toward fully recycled, high-performance and low-carbon concrete.

### Green retrofitting and renovation

Up to 80 percent of current buildings and infrastructure are expected to still be in use in 2050. This means that retrofitting is essential to ensure sustainable buildings in use and to decarbonize cities. We understand the importance of preserving buildings to decarbonize the built environment. From roofing systems to advanced mortars, our solutions enhance the functionalities of existing buildings, ensuring their sustainable use in the long term. Through longer-lasting buildings, we are helping make cities greener.



◀ Gasholders renovation in King's Cross, London, UK with Ductal slabs

## Ductal builds new from old in London

Ductal, our Ultra High Performance Concrete (UHPC), brought a special touch to the Gasholders development near King's Cross, London where an abandoned industrial site has been turned into 145 stunning new residences.

The retrofitted structures utilize mass-optimized precast Ductal panels for the inner facade, providing residents with enhanced lighting and broad views of the surrounding environment.

Reusing existing structures is one of the best ways to reduce the carbon footprint of new building and minimize resource consumption.

## Circularity in practice

Driving the circular economy addresses the challenges of climate change and resource scarcity at the same time. We use innovative solutions to return waste to the material cycle, recycling CDW and then returning that material into new building, through products such as Susteno, our resource-saving cement (see box).

### The Recycling Center Ostschweiz (RCO)

The Recycling Center Ostschweiz (RCO), a joint venture between Holcim Switzerland (AG) and Zürcher Kies und Transport AG, specializes in recycling building materials. Spread over an area of almost 18,000 m<sup>2</sup>, this unique facility sorts, treats, crushes and reuses CDW, recycling 100 percent of the materials it receives.

The center receives a wide range of CDW and turns it into high-quality gravel or mixed granules. The recycled – and recyclable – building materials are used in a wide range of applications, such as in certified concrete for the construction sector as well as certified aggregates for road and civil engineering. To stay at the forefront of both innovation and sustainability, the RCO recently installed a new soil washing system that removes pollutants and foreign matter, using recycled rainwater in the process.



◀ Recycling Center Ostschweiz (RCO) near St. Gallen, Switzerland

## Susteno, the circular cement

Susteno is the world's first resource-saving cement with 20 percent recycled construction and demolition waste (CDW) inside.

Susteno is made possible by processing and upcycling materials from demolition projects, resulting in a cement that closes the loop on CDW to build new from the old and preserve nature.

We introduced Susteno in Switzerland four years ago. Our experience shows that customers can enjoy the sustainability benefits that circular cement offers without compromising performance. We are well prepared to expand our circular range in 2023, first in Europe, taking advantage of upcoming changes in building norms. Our goal is to make circular cement accessible to more customers as standards evolve, enabling circular construction at scale.

The innovative processes employed at the RCO ensure a significantly higher product quality and usefulness for new construction. Today, the RCO can process around 200,000 tons of such material per year and supply it back to the construction sector – return it to the construction of more than 500 single-family houses with recycled building materials.

The RCO's new company building is itself made with a high proportion of recycled material, with the concrete elements entirely made of EcoPact+, containing Susteno cement and 70 percent recycled concrete aggregates. It serves as a showcase for the many advantages of sustainable and circular economy in building.

# PARTNERING FOR A 1.5°C FUTURE

At Holcim, we believe the future of the built environment is circular. Cities are at the forefront of the shift to a circular economy, so we strive to enable greener, more sustainable and circular cities of tomorrow. We are convinced that circularity is the business opportunity of our time, and the key to building progress for people and the planet.

We recognize that this future cannot be built alone, and a rapid shift towards deep collaboration across the value chain is needed to succeed. To do this, Holcim is actively engaged with various frameworks and initiatives, working with partners in change to shift towards a sustainable future.

Together with our partners, Holcim is working to tackle key topics including decarbonizing buildings, circular construction, biodiversity conservation and affordable housing.

## GLOBAL ALLIANCE FOR BUILDING AND CONSTRUCTION (GABC)

Since 2015, we have supported the GABC in promoting a zero-emissions, energy-efficient and resilient construction sector. The GABC raises the level of ambition in retrofitting existing buildings and future-proofing the investments that will go into new buildings over the next 15 years.



## WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT (WBCSD)

WBCSD is the premier global community of over 200 of the world's leading sustainable businesses working collectively to accelerate the system transformations needed for a net-zero, nature-positive and more equitable future. CEO Jan Jenisch is on the Executive Committee of the WBCSD.



## BUSINESS FOR NATURE

CEO Jan Jenisch signed the Call to Action of Business for Nature, which brings together influential organizations and forward-thinking businesses seeking to reverse nature loss. Chief Sustainability and Innovation Officer Magali Anderson is a member of the Business for Nature's Strategic Advisory Group, supporting them to set directions and prioritize actions.



## 50L HOME COALITION

In 2022 we joined the 50L Home Coalition as a Board member for water and energy-efficient homes and cities.



## MIT CLIMATE & SUSTAINABILITY CONSORTIUM (MCSC)

Holcim is a founding member and retains an advisory board position with the MIT Climate & Sustainability Consortium (MCSC). The MCSC is a new kind of academia and industry collaboration, working together to vastly accelerate the implementation of large-scale, real-world solutions, across sectors, to help meet global climate and sustainability challenges. It aims to lay the groundwork for one critical aspect of MIT's continued and intensified commitment to climate: helping large companies usher in, adapt to and prosper in a decarbonized world.



## WORLD GREEN BUILDING COUNCIL (WGBC)

Holcim is part of the Corporate Advisory Board of the WGBC. The WGBC is a global action network that aims to transform the building and construction sector across three strategic areas—climate action, health and wellbeing and resources and circularity.



## FIRST MOVERS COALITION

Launched by US Special Envoy for Climate John Kerry, the First Movers Coalition brings together like-minded organizations to drive green demand in key sectors from mobility to construction in partnership with the World Economic Forum.



First Movers Coalition



## WATER RESILIENCE COALITION

As a member of the Water Resilience Coalition, Holcim will ensure its water-positive impact methodology aligns with the Coalition's Net Positive Water Impact concept.



WATER RESILIENCE COALITION



## NORMAN FOSTER FOUNDATION

Holcim and the Norman Foster Foundation have partnered to rethink emergency shelters to turn them into sustainable and resilient homes. At the 2022 Shelters Workshop we brought together academics and students to find solutions for dignified temporary housing to meet the growing need for shelter in the face of climatic and geopolitical events.

Norman Foster Foundation



◀ 2022 Shelters Workshop with the Norman Foster Foundation

# OPEN INNOVATION



▲ Cepovett  
Headquarters in Gleizé,  
France with Ductal  
Envelope



# SHAPING THE FUTURE OF BUILDING

At Holcim, we are pushing the boundaries of innovation to shape the future of building. To make a bigger difference, we're partnering with the brightest minds in our sector in an open innovation ecosystem.

## Cutting-edge research and development

Innovation is a catalyst to decarbonize building. We operate in an open innovation ecosystem, working with hundreds of start-ups, like-minded companies and leading academic institutions, from MIT to ETH Zurich.

It all begins with our researchers working in our industry-leading Holcim Innovation Center in Lyon, France, and in our Switzerland Technology Center. To spread innovation across our markets, researchers from the Innovation Center work in close collaboration with our network of regional innovation hubs. Together with our commercial teams, they support our customers for all their building needs from concept to creation. Our experts cut across all fields of building, from masons to engineers to material scientists, to experts in artificial intelligence and data mining. The Innovation Center drives cutting-edge research in more than 15 areas, from CO<sub>2</sub> reduction to ultra high strength concrete and 3D printing. Through this system we launched more than 450 new products in 2022.



## 3D printing for more powerful wind turbines

Holcim has a key role to play in accelerating the transition towards clean, renewable energy. We have been studying 3D printing in concrete for nearly a decade and the potential of this technology just keeps expanding.

“Projects that would have been impossible yesterday are now a reality,” notes Edelio Bermejo, Holcim’s Head of Global R&D.

Holcim, GE and COBOD are co-developing wind turbines with optimized 3D printed concrete bases, reaching record heights up to 200 meters. Such innovations can help generate more than 33 percent more renewable energy from a single tower.



## Storing energy without batteries: our breakthrough technology

Imagine if you could store energy replacing batteries with a local, safe, affordable and recyclable material. With our university partner INSA Lyon and energy company ENGIE, we are developing a breakthrough energy storage technology to serve as an alternative to batteries.

The solution is based on cement hydration, storing heat as energy and releasing it when needed in an infinitely repeatable cycle, all while avoiding the environmental and material challenges associated with conventional batteries.

This innovation is based on leveraging the unique properties of a specific cementitious material that can absorb 300 kWh of energy per m<sup>3</sup> and release it later through hydration. It is designed to store the surplus energy that runs through a heating network and release it when needed through a hydration trigger.

In a world with fluctuating energy demands, this new approach could be key to meet the demands of renewable energy storage while optimizing urban heating networks, advancing our vision to build greener cities that work for people and the planet.

The world needs innovative solutions to accelerate our shift towards renewable energy generation, distribution and storage – all areas in which Holcim can play a big part. With this collaboration we are moving energy storage forward, opening up a new range of solutions based on materials that are local and recyclable.

# OPEN INNOVATION CONTINUED

## Our academic network

We understand the importance of collaboration to achieve true innovation. That's why we partner with leading academic institutions around the world to advance sustainable construction.

At Holcim, we are working with over 40 leading universities. Working in a range of fields from civil engineering to sustainable construction and materials science, our academic network is an incubator for next-generation technologies. These collaborations help us expand our ranges of innovative, low-carbon building products and solutions on our path to net-zero. This year, we initiated collaborations with Mines ParisTech and started working on a system of modular construction with the MIT Climate & Sustainability Consortium.



### SHIZHE HONG

PHD student, Cambridge University  
(Professor John Orr)

Shizhe started his academic career at Tongji University in Shanghai in Civil Engineering before continuing his studies in Material Science at École des Ponts ParisTech in France. He is now one of the R&D engineers working at the Holcim Innovation Center in Lyon. As part of the R&D project Carbon Efficient Construction, he is doing his PhD research on the decarbonization of construction through optimized design, under the supervision of Professor John Orr at the University of Cambridge. This project is a collaboration between Holcim Innovation Center and the University of Cambridge.

“Optimizing the shape of concrete structural elements with alternative low-carbon reinforcement will take us one step further on our net-zero journey. I am delighted to have the opportunity to explore this solution, thanks to the collaboration between Holcim, a global leader in sustainable building solutions, and the University of Cambridge.”

We are committed to making our collaboration mutually beneficial for our partner institutions and our business to benefit our industry and society as a whole. Each year we mentor more than 20 PhD students in sustainable design and construction. We are delighted to count some of these bright minds among our current employees, helping them turn their visionary innovations into a reality.

## Holcim Accelerator

The Holcim Accelerator is a unique start-up accelerating program that aims to accelerate sustainable construction and disruptive solutions that benefit the environment. The Holcim Accelerator is a collaboration with corporate partners Bouygues Construction, Mott MacDonald and Sika.

We select the most promising start-up businesses to work for six months with our local country teams. Following a welcome event, the teams participate in sprint sessions to finalize their roadmap. Our experts are on hand every step of the way to provide business, technical and entrepreneurial advice. Via our virtual platform, we offer webinars, online resources, and the chance to engage with experts and mentors.

Season 3 included nine start-ups selected to work on how the Built Environment needs to increase the use of low carbon materials or design solutions, while quantifying the CO<sub>2</sub> savings.

Holcim is constantly strengthening its innovation network by partnering with hundreds of start-ups around the world that are experts in fields ranging from artificial intelligence to additive manufacturing.

Edelio Bermejo, Head of Global R&D: “To decarbonize building end-to-end, we need to harness the power of open innovation and collaborate with the global start-up ecosystem. Working with start-ups allows us to advance disruptive ideas and technologies that can accelerate the transition to a net-zero future. I am delighted to see the growth we've achieved during this third season of the Holcim Accelerator.”

Bertrand Piccard, Founder of the Solar Impulse Foundation: “I am impressed with the level of technical expertise and boundary-pushing solutions I saw at this year's Demo Days. The Holcim Accelerator is a unique platform to foster collaboration between industry leaders and emerging disruptors, and I look forward to seeing how this season's start-ups continue to grow.”





◀ R&D Center, Lyon



## Low Carbon Materials

A highlight of Season 3 of the Holcim Accelerator program was Low Carbon Materials.

Low Carbon Materials (LCM) is a British start-up producing low carbon lightweight aggregates from waste materials. These aggregates improve the circular economy of the construction sector and can be used to produce precast concrete elements (such as block paving).

## ORIS

ORIS is a digital construction materials platform that uses data knowledge and sharing to provide innovative solutions for low-impact infrastructure. ORIS was a start-up incubated in the Holcim Innovation Center in Lyon. Since 2021, it is now an independent entity, its activities are ring-fenced from the rest of Holcim to ensure the neutrality of its services.

The platform combines on three areas of expertise: materials knowledge, infrastructure engineering and advanced technologies. It uses data science and AI to provide a comprehensive understanding of the sustainability of construction materials and infrastructure projects. The platform is available in France and Germany and is expanding its capabilities to new geographies to further reduce infrastructure costs, carbon footprint, maintenance needs and natural resource consumption while improving safety and resilience.

## Blue Planet

Holcim is supporting the development and commercialization of Blue Planet Systems mineralization technology. Blue Planet's novel process sequesters carbon emissions into aggregate that can make concrete carbon-negative. Each ton of Blue Planet's aggregate can mineralize up to 440 kg of CO<sub>2</sub>.

Blue Planet's CCUS technology provides circular economy benefits in that the mineralization process can consume industrial waste, such as recycled concrete, cement kiln dust (CKD) and slag, and produce new aggregate products. This investment represents another significant step toward making Holcim the global leader in innovative and sustainable building solutions.

**“Being at the forefront of driving sustainable actions in our industry requires continuous innovation and partnerships.”**

**TOUFIC TABBARA**  
Region Head, North America



# OPEN INNOVATION CONTINUED

## Holcim MAQER

Holcim MAQER is an open innovation platform that aims to drive change in the construction industry through lasting partnerships. As our venture client unit, Holcim MAQER seeks out the most innovative start-ups to solve global challenges.

In 2022, we assessed solutions from over 500 start-ups. We look for:

- **Greener start-ups** that offer sustainable building solutions, such as carbon capture technology
- **Smarter start-ups** that leverage digital tools to enable stakeholders in the construction value chain to make more sustainable decisions, like pre-design tools and material benchmarking platforms
- **Cleaner start-ups** that open up circularity opportunities like sourcing, screening and processing of CDW

The objective of Holcim MAQER is to identify the technologies that will have the biggest impact on our industry and society as a whole. We seek out collaborations with start-ups to utilize innovative solutions to their full potential. Our partnerships range from deep-tech and software companies to new business models, focusing on construction industry materials and practices.

MAQER has already connected with more than 2,000 start-ups to scale up innovation in the construction sector. Solutions range from digitizing the construction site to providing affordable housing to designing the green building materials of tomorrow.

## Slush

Holcim is helping to shape the future of venture capital investment in construction tech at Slush. The event brings together 2,600 European investors representing USD 1 trillion in assets under management. At the 2022 event we hosted panels on decarbonization, sustainable construction and our Plants of Tomorrow initiative. In addition to discussions with start-ups and venture capital investors on how new technologies, data transparency and collaboration will pave the way to sustainable construction, we met with other industry leaders like BMW, Bosch, Siemens Energy and Maersk.

## Plants of Tomorrow

Our Plants of Tomorrow initiative brings together a range of innovations aimed at improving performance.

To date, we have deployed more than 800 applications across 180 plants, utilizing technologies from automation and robotics to reach more than 5,000 deployments.

Smart online digital control solutions: Near-infrared spectroscopy, a digital online control technology, can be used to analyze alternative fuel properties during feeding and compensate for quality variations in real time using an optimal fuel mix. This solution increases the use of alternative fuels and therefore reduces CO<sub>2</sub> emissions.

CemQ: Predictive quality models use machine learning algorithms to correlate the quality of each production batch with the relevant production parameters while minimizing the clinker factor. This helps us produce less waste, identify problems early, lower CO<sub>2</sub> emissions and achieve energy savings.



### DIGITALIZING OUR PLANTS

270

Sites

1,600

Deployments

27,000

Innovators

3,000

Users worldwide

42

Proprietary solutions



## Making Industry 4.0 a reality in El Salvador

Maya is inaugurating a new Remote Plant Control system, through which its kiln and grinding station can be operated remotely from Holcim El Salvador's other cement plant, El Ronco. This solution will allow teams to monitor the processes at both plants from a single control room, ensuring uniformity and increasing efficiency.

The Maya teams are also equipped with productivity tools that enable them to strengthen profitability while safeguarding our people. To reduce high-exposure field work, drones conduct tower and kiln inspections, and automated surveillance systems point out where inventories are running low. The teams can also use a mobile app to monitor the chemical composition of the materials being processed as well as production levels across the plant, all from the palm of their hand.

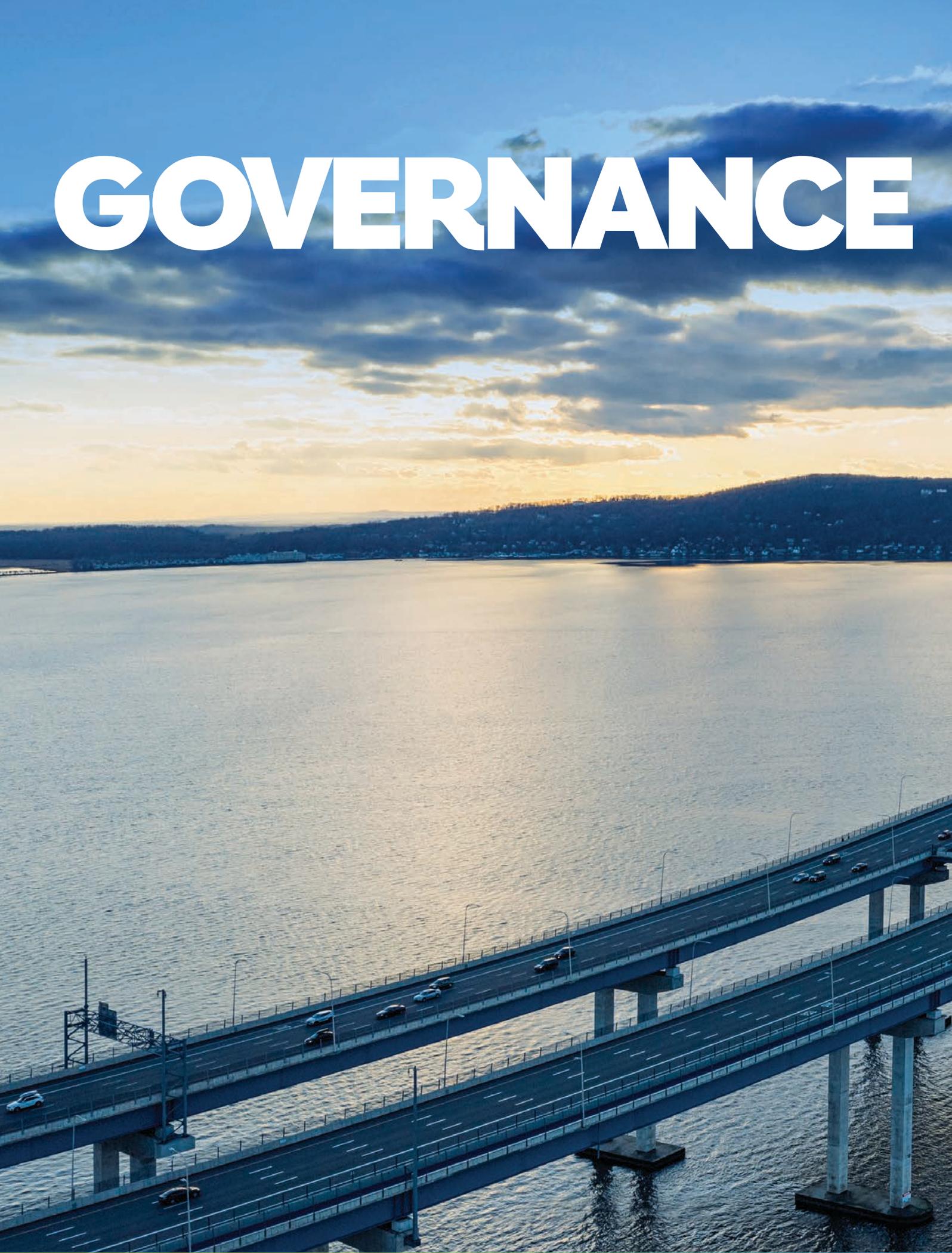
With sustainability at the core of our strategy, the next-generation technologies deployed at Maya are also geared towards reducing environmental impact. An online system for

constant monitoring of CO<sub>2</sub> emissions and energy and water consumption ensures the plant is on track to meet sustainability targets. To ensure the plant does not use more fuel than is necessary, the kiln is equipped with a state-of-the-art thermographic scanner to monitor temperature and a high-resolution camera to monitor flame size. Even Maya's circular systems are high-tech: the plant will be equipped with an autonomous feeder for alternative fuels and resources (AFR) that will allow the co-processing of 6-8 tons of waste per hour.

**“Leveraging the Group’s investment in Industry 4.0 technologies equips us to more rapidly meet our customers’ needs, optimize our environmental footprint, and consolidate Holcim’s leadership in our market.”**

**RODRIGO GALLARDO**  
CEO, Holcim El Salvador

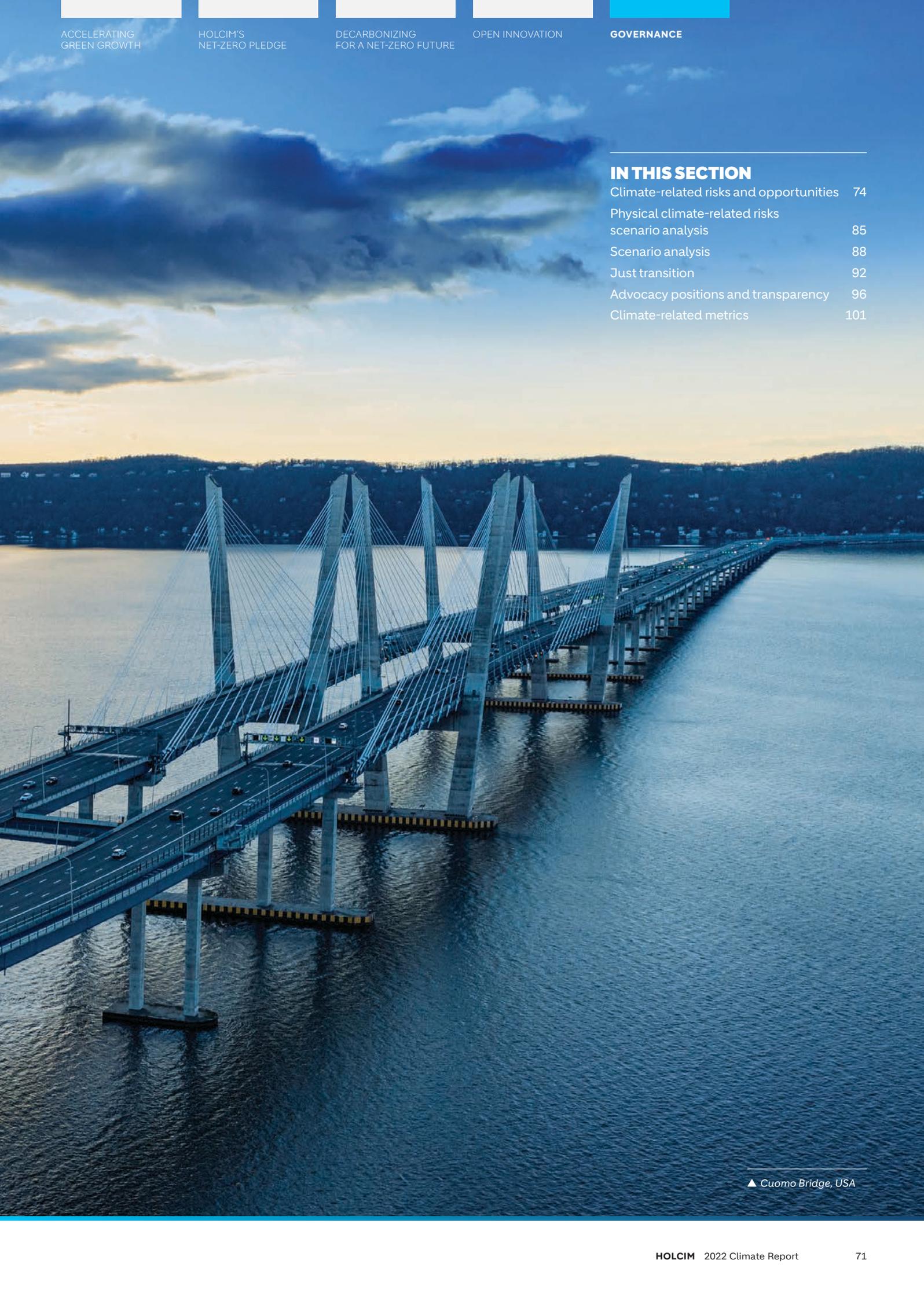
# GOVERNANCE



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▲ Cuomo Bridge, USA

# GOVERNANCE

Holcim’s climate strategy is underpinned by a commitment to transparent governance at the highest level that includes Board oversight, Executive Committee accountability and climate-related performance linked to compensation.



The Nomination, Compensation & Governance Committee (NCGC) proposes the objectives for the Long-Term Incentive Plan, which alongside financial metrics, includes metrics related to the reduction of specific net CO<sub>2</sub>, waste recycled and the reduction of specific cement freshwater withdrawals. These objectives are then approved by the Board of Directors.

The HSSC advises the Board of Directors on all matters related to sustainable development. It reviews and approves the company’s climate-related plans and targets.

The HSSC consists of five Board members. The Chairman of the Board of Directors (unless they are a member of the HSSC), the Vice Chairman, the Group CEO, the Group Chief Sustainability and Innovation Officer (CSIO), the Group General Counsel, the Group Head of Security and the Group Head of Health, Safety and Environment participate as invited guests. The HSSC meets at least quarterly.

The Board of Directors has the ultimate responsibility for the Group strategy and overall governance of the company, including Holcim’s climate strategy.

Through the Audit Committee (AC) and the Health, Safety and Sustainability Committee (HSSC), the Board of Directors oversees Holcim’s risk management and Internal Control process, including sustainability and climate change-related risks and opportunities. Under the leadership of its chairman, the responsibility for climate change lies on this committee.

The entire Board of Directors is included in the Risk Management process and is thus regularly updated on climate-related risks and opportunities, as well as potential scenarios in carbon price regulation systems such as the EU Emissions Trading System (EU ETS). The Holcim process for approval of major climate-related capital expenditures acquisitions and/or divestitures, includes climate and other environmental and societal considerations in the assessment and ultimately requires the approval of the Board.

The HSSC supports and advises the Board of Directors on the development and promotion of a healthy and safe environment for employees and contractors, as well as on sustainable development and social responsibility.

In 2022, the HSSC held four meetings. The average duration of the meetings was two hours. The president of the HSSC then reports to the Board on the conclusions of the meeting. In addition, as a member of the Executive Committee, the CSIO attends part of all Board meetings and presents the sustainability strategy at the Board strategy workshop.

In 2022, the topics discussed at the Board level include the upgrade of Holcim’s 2030 targets to be aligned with the new 1.5°C guidelines for our sector, and “Say on Climate” initiative.

The Executive Committee is ultimately responsible for the execution of the climate and energy strategy, and climate-related issues are managed at an operational level by the CSIO, an Executive Committee-level position that was created in 2019. The CSIO is supported by a core

sustainability team and experts from the countries.

The Group Sustainability team is a cross-disciplinary department that is responsible for developing and overseeing the deployment of the Holcim sustainability strategy, including its four pillars: Climate and Energy, Circular Economy, Nature and People. Additionally, the team has experts on sustainable construction and sustainable procurement. The team is responsible for continuous reviews and guides climate-related items that could influence business strategy. They closely monitor any developments concerning climate-related issues by engaging with investors and analysts, nongovernmental organizations, policy makers and trade associations.

The R&D team also plays a key role in the deployment of the Group's strategy through the continued development of sustainable solutions. More than 80 percent of R&D projects were aimed at finding sustainability-related solutions. Around 65 percent of our patents have a positive impact on sustainability along the value chain.

In 2022, we built a specific Decarbonization team responsible for accelerating the implementation of both our traditional and next-generation decarbonization levers. The team has been structured with clear governance and ownership

of the respective decarbonization levers: Plants of Tomorrow, electrical calcination, hydrogen, quarry decarbonization, processed mineral components, alternative raw materials, green power and waste heat recovery systems, CCUS, alternative fuels and green mobility. We have bottom-up decarbonization plans for every cement plant.

Holcim's Head of Group Audit is a member of the leadership team and reports directly to the Group CFO. He has direct access to the AC. The Head of Group Audit oversees the Group Holcim Enterprise Risk Management (ERM) process; consolidates business risks and reports any relevant water risks to the Executive Committee and the AC of the Board.

His key climate-related responsibilities are: developing and managing the Holcim ERM process, ensuring the inclusion of all sustainability topics (including climate and energy-related aspects); ensuring proper implementation of the Holcim ERM process throughout the Group; providing briefs on a quarterly basis to the Audit Committee on climate-related risks and opportunities if necessary or if there are indications of high climate-related risks. A meeting is specifically dedicated to the Group Risk Report where sustainability and climate-related risks are presented and discussed.

## Management incentives for sustainability

With sustainability at the heart of our strategy, the Nomination, Compensation & Governance Committee made it part of the long-term incentive plan of the company's top 200 senior leaders worldwide, making it everyone's business at Holcim to advance its net-zero journey. Senior leaders are incentivized to deliver continuous improvement across three pillars of our sustainability strategy:

- Climate and Energy: reduction of CO<sub>2</sub> emissions per ton of cementitious material produced with a 50 percent weight
- Circular Economy: quantity of recycled waste derived resources with a 25 percent weight
- Nature: reduction of freshwater withdrawal per ton of cementitious material produced with a 25 percent weight

In 2022, our outstanding performance resulted in a payout of 172 percent based on the following achievements:

- CO<sub>2</sub> emission per ton cementitious of 561.5 kg vs target performance of 569 kg/ton (50 percent weight)

- Waste recycled of 34 million tons vs target performance of 34 million tons (25 percent weight)
- Freshwater withdrawal per ton of cementitious material of 303.7 liters per ton vs targets performance of 360 liters per ton (25 percent weight)

Due to the divestment of the operating activities in India and Brazil, and the derecognition of Russia from our key performance indicators, the sustainability targets for the outstanding performance shares granted in 2020 and 2021 were adjusted to comply with the "Sustainability Framework Guidelines" of the Global Cement and Concrete Association (GCCA) for CO<sub>2</sub> reporting. Those require the deconsolidation of divestments for the full year and the restatement of historic emissions, which are the baseline to measure emission reductions. The new baselines were externally validated by EY & Associés.

Holcim additionally set ambitious targets for 2024 performance applicable to the performance shares granted in 2021.

- CO<sub>2</sub> emission per ton cementitious of 534 kg (50 percent weight)
- Waste recycled of 41 million tons (25 percent weight)
- Freshwater withdrawal per ton of cementitious of 302 liters per ton (25 percent weight)

These targets are in line with our long-term sustainability goals and net-zero ambition.

# CLIMATE-RELATED OPPORTUNITIES AND RISKS

## **INCREASING DEMAND FOR LOW-CARBON BUILDING SOLUTIONS**

As a global leader in innovative and sustainable building solutions, our products play an essential role in the development of greener buildings and more liveable cities. Demand for low-carbon building materials has grown significantly, as has the number of net-zero commitments of different actors in the construction value chain.

This demand drives sales of products like ECOPact low-carbon concrete while helping to reduce our Scope 1 emissions, as well as to help our customers reach their decarbonization goals.

We are constantly expanding our range of smart building solutions to repair, refurbish and renovate buildings, from roofing and waterproofing all the way to insulation systems, making them smarter and more energy efficient.

Our roofing systems cut across residential and commercial applications and enable a range of systems from green and cooling to solar roofs. Another example is our Airium™ insulating system that helps to improve the energy efficiency of buildings while being fully recyclable and more durable than traditional insulation systems.

Being at the forefront of decarbonizing our manufacturing process and building material products is a clear opportunity as both carbon pricing mechanisms and supportive norms and regulations continue to evolve. Based on these trends we target 25 percent of total ready-mix net sales from ECOPact low-carbon concrete by 2025.

## **CONCRETE: A MUST FOR CLIMATE MITIGATION AND ADAPTATION**

At least 90 percent of the world's electricity must come from renewable sources by 2050. Concrete will be indispensable to building the wind, solar and hydropower sources that are needed to accelerate this transition to renewable energy. Thanks to its high thermal mass, concrete also minimizes energy requirements of buildings in extreme temperatures, thus reducing CO<sub>2</sub> emissions from buildings' energy consumption.

The frequency and severity of extreme weather events such as floods, hurricanes, earthquakes, droughts and sea rise will increase due to climate

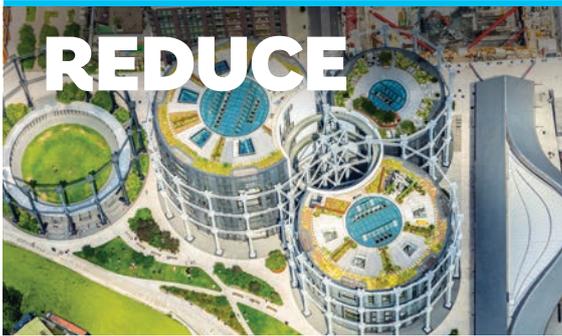
change. Concrete will be key to adapting to these consequences, protecting society and the environment in an affordable manner. Products such as ECOPact low-carbon concrete are the best solution to build stronger, climate-resilient cities that protect residents and property from fire and flood, as well as coastal infrastructure that can mitigate the impact of rising sea levels and storm surges.

## **CLIMATE-RELATED RISKS**

At Holcim we take a proactive approach to managing climate-related risks and we support the recommendations of the Task force on Climate-related Financial Disclosures (TCFD). The identification, assessment and effective management of climate-related risks and opportunities are fully embedded in our Risk Management process.

We have proactively mapped International Financial Reporting Standards (IFRS) to climate-related matters, linking each climate-related risk to the relevant IFRS (IAS) standard (see below).

We make estimates and assumptions concerning the future, including on climate-related matters. There is considerable uncertainty over assumptions and how they will impact our business operations and cash flow projections. We constantly assess these assumptions in light of our risk management practices and commitments we have made to our investors and other stakeholders.



## REDUCE

We are reducing the footprint of building across its lifecycle. We enable low-carbon construction with ECOPact concrete, offering 100 percent performance with at least 30 percent less CO<sub>2</sub>. We make buildings more energy efficient with insulation systems such as Elevate's ISOGARD boards, offering up to 40 percent better thermal performance compared to competitive products in the market.



## RECYCLE

We recycle over 30 million tons of materials per year to build better with less. We offer the world's first cement with 20 percent construction and demolition waste inside. Malarkey shingles contain recycled plastic bags and rubber inside, while Duro-Last turns roofs at the end of their life into new materials.



## REGENERATE

With Elevate vegetative roofs, urban forests enabled by Hydromedia permeable concrete, bioactive concrete reefs and quarry restoration plans, we are regenerating ecosystems to preserve biodiversity.

## Circular construction: the opportunity of our time

The world economy has grown to unprecedented levels, with global GDP now exceeding USD 94 trillion. On this trajectory we are set to consume 2.3 planets by 2040. To make this work for people and the planet, we need to shift gears: from a linear "take-make-waste" economy to a circular "reduce-reuse-recycle" one.

As a world leader in recycling, we recycled over 30 million tons of materials across our business in 2022, nearly 7 million tons of which was construction and demolition waste. Our goal is to recycle at least 10 million tons of construction and demolition waste by 2025 to build more new buildings from old ones.

As concrete is infinitely recyclable, we are building up the capacity to recycle 100 percent of concrete-based construction and demolition waste with proprietary technologies and systems. In addition, our co-processing of waste to recover energy and recycle minerals during cement production has mitigated the rising cost of traditional fuels. In plants where we have achieved high substitution rates, fuel costs have been reduced significantly or even become a source of income.

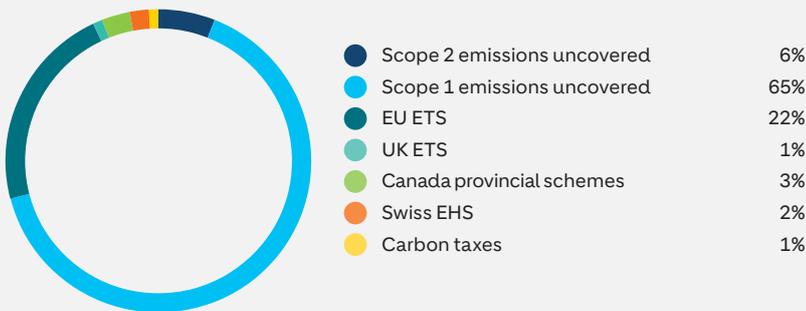
# CLIMATE-RELATED OPPORTUNITIES AND RISKS CONTINUED

## Overview of our exposure to CO<sub>2</sub> regulations

### COVERAGE OF HOLCIM SCOPE 1 + 2 EMISSIONS BY CO<sub>2</sub> PRICING SCHEMES

Currently, the emissions of our operations in Europe under the EU ETS represent

22 percent of the Group's Scope 1 emissions. The rest of our operations that fall under carbon trading schemes or carbon taxes outside the EU represent 7 percent (Canada, Mexico, UK and Switzerland). In other regions, more stringent CO<sub>2</sub> regulations may be implemented, especially in emerging economies such as China, or in mature economies such as the US and Australia.



◀ Seven Gardens Oak House quarter in Wiesbaden, Germany built with DYNAMax, the ultimate performance concrete

## POLICY AND REGULATORY

### DESCRIPTION OF THE RISK

Following the agreement on climate at Paris COP21, signatory countries are required to commit to a CO<sub>2</sub> emissions reduction pathway. The likely effect of this is a growing number of CO<sub>2</sub> regulations that will increase the cost of emitting CO<sub>2</sub>.

In the EU, the introduction of phase IV of the ETS in 2021 reduced CO<sub>2</sub> allowances and exposed Holcim to increased pricing of CO<sub>2</sub> emissions.

In 2022, as part of its Green Deal, the European Union has adopted the Carbon Border Adjustment Mechanism (CBAM) as a central engine of the low carbon transition. However, it is still uncertain whether the CBAM will ensure the competitiveness of the European cement players establishing the needed effective, fair and reliable carbon pricing mechanism that establishes a level playing field on carbon costs between domestic manufacturers and importers. This forms the central pillar of the low-carbon business case and is fundamental to our ability to invest on a large scale in the deployment of low-carbon technologies and products.

Holcim welcomes the EU Taxonomy which creates a robust environment that encourages direct investments towards sustainable projects and activities and helps scale up sustainable development towards the objectives of the European Green Deal.

In the US, although there is no regulatory framework comparable to the current European ETS. The political agenda is also moving towards green growth, with recent initiatives such as the Inflation Reduction Act in 2022 that create an overarching incentivizing environment to deploy low-carbon and resource-efficient technologies at scale.

### THE IMPACTS

The most likely impacts would be an increase in production, operation and distribution costs caused by the rise in carbon taxes, price of emissions allowances and reduction of free allowances.

In Europe, the absence of efficient border adjustment mechanisms might bring more competition around imports of clinker and cement. In the longer term; however, one of the possible side effects of more stringent CO<sub>2</sub> regulations and associated environmental measures will be to reinforce the competitive advantage of our position since our low-carbon footprint may be reflected in the final price of the product.

#### Impacts on financial reporting

Useful lives of assets may be affected by climate-related matters because of transitional risks such as obsolescence and legal restrictions. The change in useful lives has a direct impact on the amount of depreciation or amortization recognized each year. Management's review of useful lives has taken into consideration the impacts of the Group's 2030 targets (see IAS 16 and IAS 38). It can also lead to the impairment of operating assets that no longer comply with more stringent environmental measures (see IAS 36).

Climate-related matters may affect the level of provisions recognized, such as site restoration provision and litigation provision as a result of the levies imposed by governments for failure to meet climate-related targets or new regulations, requirements to remediate environmental damages on Holcim's sites or due to existing obligations now being considered more likely. Some contracts may become onerous as a result of climate-related changes, which would potentially decrease the Group's revenue or increase its operating costs (see IAS 37).

### OUR RESPONSE

Changes in regulatory frameworks worldwide are monitored centrally in order to assess our exposure to new CO<sub>2</sub> pricing schemes, but also to identify market incentives for low carbon products or any developments that require us to accelerate or adapt the deployment of our decarbonization roadmap.

Our CO<sub>2</sub> reduction roadmap follows a best-in-class approach with our 2050 net-zero pledge validated by SBTi. In 2022, we've reinforced our leadership with the validation by the SBTi of our near-term target (2030) in line with the 1.5 °C science-based target. In parallel, we transform the Group into a global leader in innovative and sustainable building materials and solutions, decarbonizing building and driving circular construction.

Holcim proactively and transparently engages with external stakeholders and supports the implementation of effective carbon pricing mechanisms in order to:

- provide a level playing field on carbon costs between domestic producers and importers (e.g. carbon border adjustment mechanisms)
- support the enforcement of reliable carbon prices and investments in low-carbon technologies (incl. regulatory stability)
- develop carbon pricing mechanisms that encompass both supply (carbon emissions) and demand (carbon consumption).

⊕ Further details in relation to our climate-related advocacy positions are included on pages 96–100 of this report.

# CLIMATE-RELATED OPPORTUNITIES AND RISKS CONTINUED

## EU Taxonomy

The EU Taxonomy regulation established a classification system for economic activities based on their contribution to sustainability which is intended to create transparency and certainty for investors, and direct sustainable investment.

Holcim has identified the following activities that are eligible for EU Taxonomy classification for the objective of Climate change mitigation: cement manufacturing, manufacture of energy efficient equipment for buildings, materials recovery from non-hazardous waste, and electricity generation using solar photovoltaic technology.

Holcim takes a transparent, science driven and rigorous approach to its climate and environmental reporting and this includes changes in the regulatory environment such as the European Commission's work and the establishment of the EU Taxonomy regulation. Holcim voluntarily discloses key financial metrics in relation to EU Taxonomy and will continue to evolve its interpretation and processes to report on the alignment with EU Taxonomy within the deadlines set out by the Corporate Sustainability Reporting Directive (CSRD).

### ACCELERATING GREEN GROWTH IN LINE WITH EU TAXONOMY

The environmental objectives of the EU are embedded in Holcim sustainable growth strategy and the on-going aligned actions are described below.

### GREEN OPERATIONS - DECARBONIZING HOLCIM

We are decarbonizing Holcim with green operations, from green energy and mobility to green product formulation, all the way to next generation technologies like carbon capture, usage and storage.

### Green Formulation

Holcim continued to decrease the CO<sub>2</sub> emissions of its cement products by reducing the amount of clinker in cement, and increasing the use of biomass, low emission fuels, and alternative raw materials.

Clinker is the most CO<sub>2</sub> intensive component of cement with roughly two-thirds of CO<sub>2</sub> emitted as a result of the chemical reaction in the manufacturing process. One most meaningful way to reduce CO<sub>2</sub> emissions of cement is by replacing clinker with other materials. This includes calcined clay used in the ECOPlant cement produced by Holcim's plant in Saint-Pierre-la-Cour, France with 50 percent lower CO<sub>2</sub> and "Susteno", the first resource-saving cement in Europe that uses up to 20 percent fine mixed granulate from Construction and demolition waste to replace clinker.

### Green Energy

Alongside its manufacturing activities, Holcim promotes the use of clean energy which contributes to climate change mitigation:

- Electricity generation based on solar photovoltaic technology and wind power.
- Utilization of excess heat from cement kilns to generate electricity: currently seven waste heat recovery units are operating in five countries, with a plan to triple this number by 2030.

### MAKING BUILDINGS SUSTAINABLE IN USE - DECARBONIZING CITIES

Holcim Solutions & Products, from roofing to insulation, are making buildings more sustainable in use to decarbonize our cities, driving energy efficiency and green retrofitting.

Holcim Building Envelope, encompassing its roofing business, supplies a wide range of insulating, cool and green roofing systems from the US and Europe with a lambda value lower or equal to 0.06 W/mK.

### CIRCULAR CONSTRUCTION - MAKING NEW FROM OLD

We drive circular construction to build new from the old. As a world leader in recycling we put circularity at the core of everything we do.

The Asphalt business contributes actively to the circular economy by providing a large range of Asphalt products which contain recycled asphalt. In Canada Holcim recycled

used asphalt from the resurfacing of roads and consumed it in the production process of new asphalt.

## REPUTATION

### DESCRIPTION OF THE RISK

The Group's inability to meet its commitments (net-zero pledge and intermediate 2030 targets), if materialized, would have a significant impact on the Group's reputation.

In light of shifting reporting requirements, and increased public scrutiny, there is a growing reputational risk in case the Group is found to have misreported its emissions or if its targets and claims are not ambitious enough, or if they are deemed incomplete, vague, ambiguous or insufficiently documented on a scientific basis. In addition to the impact on our reputation that those misstatements might have, litigation on the basis of climate action failure (including misreporting of emissions) is emerging and could also exacerbate the damages to our reputation.

### THE IMPACTS

A damaged reputation, especially among investors and regulators, could hamper the Group's access to capital, increasing financing costs in the short term.

It could additionally reduce growth outlook in the mid-term due to lower attractiveness to investors. We may not have a sufficiently robust talent pipeline if we cannot attract and retain talent due to perceived weak environmental credentials.

#### Impacts on financial reporting

Holcim has increased diversification of financing instruments with, for example, sustainability-linked bonds, which are linking our funding with our sustainability objectives. This could have an impact on the Group's financial expenses in the event the Group does not reach the targets that have been set (see IFRS 7).

### OUR RESPONSE

Our response to this risk mainly relies on the reduction of our CO2 footprint as well as the validation by the Science Based Targets initiative (SBTi) of our targets for all scopes, including our 2030 target in line with the 1.5°C science-based framework.

In addition, to reflect the credibility of our sustainability commitments to investors, Holcim continues to offer investors debt linked to its sustainability and ESG performance.

Holcim intends to pursue its journey with sustainability-linked financial instruments in the capital, money and loan markets. We are committed to reaching more than 40 percent of sustainable financing by the end of 2025.

# CLIMATE-RELATED OPPORTUNITIES AND RISKS CONTINUED

## Sustainability linked financing framework

Recognizing the role of sustainable finance in supporting the transition to a low-carbon and more resource efficient economy, we have put in place a sustainability-linked financing framework to link funding activities with our sustainability objectives.

It started with CO<sub>2</sub> reduction, in line with our 2030 climate targets and updated with the full 2050 net-zero pathway endorsed by the Science Based Targets initiative (SBTi). Following our nature-positive strategy launch, we also added “specific freshwater withdrawal” in our cement operations.

A third party opinion was provided by ISS ESG and confirmed the alignment of the framework with the sustainability-linked bond principles, which are published by the International Capital Markets Association (ICMA). The framework is also aligned with the United Nations Sustainable Development Goals 6 “Clean Water and Sanitation”, 9 “Industry, Innovation and Infrastructure”, 11 “Sustainable Cities and Communities” and 13 “Climate Action”.

We intend to pursue our journey with sustainability-linked finance instruments in the capital, money and loan markets. Holcim is committed to reaching more than 40 percent of sustainable financing by the end of 2025.

In 2022, Holcim completed further sustainability-linked financing transactions which include (i) new 4.75 year CHF 325 million and 10 year CHF 100 million sustainability-linked bonds, issued in January 2022 based on our 2025 and 2030 climate goals, (ii) a new 4 year EUR 150 million sustainability-linked private placement, issued in April and based on our 2025 CO<sub>2</sub> scope 1 as well as 2025 Freshwater Withdrawal reduction targets and (iii) EUR 514.5 million and USD 147.5 million sustainability-linked Schuldschein with maturities between 3 and 10 years based on our climate and water goals.

At the end of 2022, the sustainable financing ratio stood at 38.3 percent, on track to reach our 2025 target.

**>40%**  
Financing agreements linked to sustainability goals by 2025

## MARKET

### DESCRIPTION OF THE RISK

In the long term, should regulatory frameworks fail to incentivize consumption of low-carbon products, customers may be unwilling to pay for additional costs and the cement sector's low-carbon roadmap might be compromised.

On the supply side, as the call for decarbonization impacts our supply chain beyond 2030, inflationary pressures in raw materials, energy and transportation are possible.

### THE IMPACTS

The impacts include reduced demand for products with volume or price decreases, leading to revenue losses. At the same time, however, and as long as there is no viable substitute to cement on a global scale that is affordable and local, those new market conditions might support a growing demand for low-carbon products and solutions, thus potentially increasing our market share in the range of low-carbon cement and sustainable solutions.

Higher prices for mineral components (MIC) such as slag and fly ash challenge the CO<sub>2</sub> reduction roadmap as the integration of MIC in our cement production process is a key lever for the reduction of clinker factor and thus reduction of our CO<sub>2</sub> footprint. Concurrently, this risk might also reduce Holcim's profitability.

#### Impacts on financial reporting

Impairment testing is performed at the cash generating unit (CGU) level and in assessing the valuation of a CGU, future cash flows have been estimated. This includes making assumptions in relation to the impact of climate-related matters on future profitability.

Cash flow projections are generally based on a three-year financial planning period using business plans approved by management. At year-end 2022, cash flow projections were based on a four-year financial planning period to align with the Group's Strategy 2025 – "Accelerating Green Growth" (see IAS 36).

The impact of climate-related matters could result in higher costs and reduced revenues affecting the future taxable profits on which the recognition of deferred tax assets are based. Business plans used for the recognition of deferred tax assets have been aligned with those used in the impairment process, taking into account climate-related impacts (see IAS 12).

### OUR RESPONSE

Our approach is to meet customer needs along the whole construction value chain by developing and delivering solutions that address today's major construction challenges: achieving energy efficiency, lowering the cost of construction and reducing its environmental footprint.

Holcim has a broad range of sustainable solutions. From our ECOPlanet sustainable cement range to ECOPact low-carbon concrete, Holcim offers solutions with cutting-edge materials and innovation. The Group is continuously developing and introducing new products with lower CO<sub>2</sub> emissions, realizing opportunities related to the circular economy and sustainability performance. In 2022, our total sales of sustainable solutions represented 32 percent of our overall sales. In 2022, ECOPact low-carbon concrete, with at least 30 percent lower CO<sub>2</sub> emissions than conventional concrete, reached 13 percent of Ready-Mix Concrete net sales, on target to reach 25 percent by 2025.

Also, we will continue to deploy smart technologies, from 3D printing to using green mineral components like calcined clay, and we will further develop next-generation technologies.

In the long term, portfolio changes with the development of our Solutions & Products business line will contribute to a shift to a business model that offers integrated solutions and systems specifically designed to tackle climate change challenges, such as: energy efficiency, extending the longevity of building materials and enhanced options to generate renewable energy. With regard to changing market conditions for mineral components, Holcim has implemented a strong set of actions such as changing input mixture (development of alternative MIC or new binders), and strategic sourcing through common initiatives with suppliers and the development of imports.

# CLIMATE-RELATED OPPORTUNITIES AND RISKS CONTINUED

## TECHNOLOGY

### DESCRIPTION OF THE RISK

The risk of the cost of technology or new investments being significantly higher than existing carbon pricing mechanisms and the lack of integrated deployment of carbon capture in the supply chain ecosystem (transportation, sequestration, etc.), could prevent Holcim from achieving its targets.

The pathway from 2030 to 2050 integrates new and advanced technologies including novel binders, zero-emission vehicles, low-clinker cements and scaled up CCUS. As of today, the development of those next-generation technologies, especially CCUS, relies on pilot projects that are still to be evaluated in terms of cost, technical feasibility, compatibility with CO<sub>2</sub> usage opportunities and other aspects of viability and scalability.

### THE IMPACTS

There could be significant costs to transitioning to lower emissions technology if CAPEX and operational costs significantly exceed other offsets, such as from CO<sub>2</sub> price increase or increased demand.

#### Impacts on financial reporting

Useful lives of assets may be affected by climate-related matters because of transitional risks such as technological obsolescence. It can also lead to the impairment of operating assets (see IAS 36).

Sustainability is now a key factor considered by the Group in any investment decision. The transition to lower-emission technologies will impact the allocation of future CAPEX. The Group's R&D expenditures are aligned with the strategy to focus on new and alternative technologies that, as a result of diverse research initiatives, may either impact CAPEX or R&D costs in the statement of income, depending on the success of the initiatives (see IAS 16 and IAS 38).

### OUR RESPONSE

In line with our 2025 strategy and 2030 target, Holcim is maximizing existing technologies and processes, such as: reduced clinker content, increased use of waste-derived fuels and alternative raw materials, waste heat recovery, and renewable energy portfolio.

We are now scaling up innovations and proven solutions such as increasing the use of low-carbon raw materials from construction and demolition waste to the replacement of slag or fly ash by novel binders, such as calcined clay. As a result of our efforts, Holcim launched Europe's first calcined clay cement operation in France in February 2023.

Holcim is piloting more than 50 CCUS and mineralization projects in Europe and North America. Working with other multinationals as well as start-ups, our objective is to create a portfolio of diverse and cost-effective solutions that can be multiplied across the Group to advance our decarbonization journey and create new growth opportunities. We aim to have the first net-zero plant operating by 2030, and as such we will harness any opportunity to realize this goal in Europe, North America or other markets. In 2022, two Holcim plants, one in Germany (Lägerdorf) and one in Poland (Kujawy), have been awarded a total of EUR 338 million from the EU Innovation Fund to support and assist the commissioning of carbon capture facilities.

## GREEN CAPEX AT HOLCIM

At Holcim, we have put sustainability at the core of our strategy to build a net-zero future. Our focus on green investments is a fundamental aspect of this strategy.

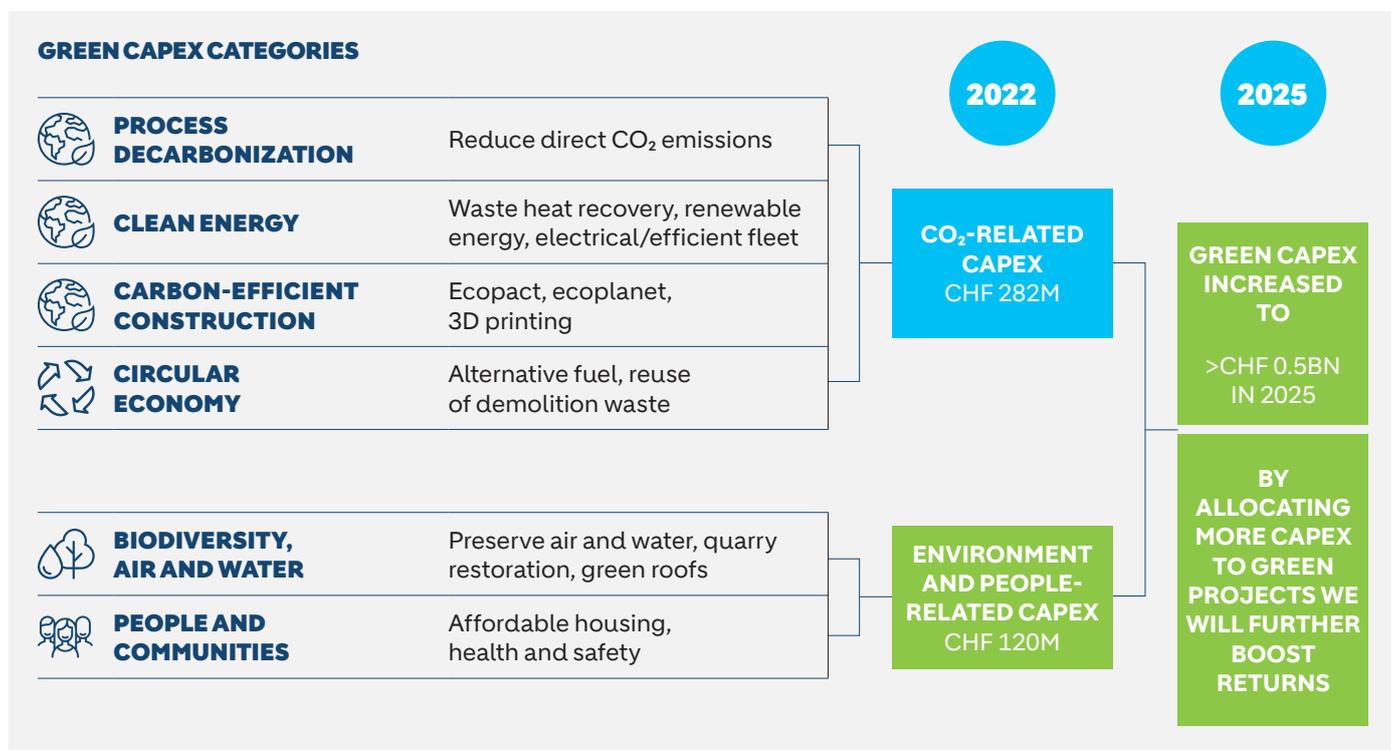
As part of our Green CAPEX program, we invested CHF 282<sup>1</sup> million in 2022 for projects aimed at accelerating our CO<sub>2</sub> reduction.

We will increase our annual green CAPEX to CHF 500 million by 2025. These investments will

impact all our operations and geographies and will encompass existing technologies with proven returns.

We are committed to align capital expenditure plans with our long-term net-zero reduction target, which has been validated by SBTi and is aligned with the Paris Agreement's objective of limiting global warming to 1.5°.

<sup>1</sup> Pro forma basis, 2022



# CLIMATE-RELATED OPPORTUNITIES AND RISKS CONTINUED

## PHYSICAL RISK

### DESCRIPTION OF THE RISK

The physical impacts of climate change (such as flooding, changes in precipitation patterns or extreme variability in weather patterns) have the potential to disrupt our operations – both our on-site operations and transportation activities – leading to higher logistics and transportation costs as well as reduced production capacities (e.g. delayed planning approval, supply chain interruptions).

Our business is particularly exposed to significant variations in river water levels affecting river-based supply chains and product delivery, including when very low (Rhine in 2018) or very high (Mississippi in 2019). The change in the climate may imply more regular and intense climate events that can have a significant impact on our production with business interruption, accident or damages. This may increase our insurance costs due to the higher amounts at stake or more frequent insured cases.

In addition, the Group operates in areas exposed to water scarcity, which could lead to potential disruptions in our operations.

### THE IMPACTS

#### Impacts on financial reporting

Physical deterioration of our production assets would result in potential impairment (see IAS 36). The climate-related matters may affect the value of inventories as they may become obsolete as a result of a decline in selling prices or an increase in costs. In the application of IAS 2, the cost of inventories that are not recoverable must be written down to their net realizable value.

The change in the climate may imply more regular and intense climate events that can have a significant impact on our production with business interruption, accident or damages. This may increase our insurance costs due to the higher amounts at stake or more frequent insured cases (refers IFRS 17).

### OUR RESPONSE

Holcim has introduced a risk-based Security and Resilience Management System to plan for, respond to and recover from all kinds of unwanted events through integrated emergency response, crisis management and business continuity activities.

To be prepared to deal with variations in river water levels, especially flooding events, our logistics departments have developed well-prepared response plans that involve a change in product sourcing from our network of plants, additional storage options for inventory and adapting our transport methods.

With regard to water scarcity, a Water Stewardship Program has been launched aiming to reduce our specific freshwater withdrawal and return the water we use. As a result, we are currently one of the leaders in our industry in this regard.

In order to prepare further for increased frequency and severity of adverse events exacerbated by climate change, we launched a systematic approach to natural catastrophe risk management in 2022. This multi-functional program (the so-called “NatCat program”) assesses our exposure to current and future natural catastrophes in light of different climate scenarios based on the trajectories considered by the Intergovernmental Panel on Climate Change (IPCC). It provides a framework for mitigation planning and response and is key mitigation to ensure the safeguarding of people and business.

# PHYSICAL CLIMATE-RELATED RISKS SCENARIO ANALYSIS



◀ Gasholders renovation in King's Cross, London, UK with Ductal slabs

As part of Holcim's scenario analysis, acute and chronic physical climate-related risks have been assessed by Holcim throughout its 62 sites in 31 countries. When conducting this study Holcim aimed to quantify the potential financial impact of climate hazards at a site level and along supply chains. The study has been carried out based on physical climate risk insights provided by the Swiss Re RDS Sustainability Compass tool.

Ten climate risk scores were used to assess the development of climate risks under three different future scenarios (SSP1-2.6, SSP2-4.5, and SSP5-8.5) based on the Intergovernmental Panel on Climate Change Sixth Assessment Report. The scenarios consider greenhouse gas concentration

trajectories in the atmosphere and relate to a 1.5°C–2°C, 2°C–3°C and >4°C increase in the global average surface temperature in 2100 respectively. For each location the changes to acute physical climate hazards such as flood, wind, precipitation and chronic hazards such as heat and drought were assessed for each scenario and the years 2025, 2030, 2050 and 2085.

This builds on last year's initial study where a sample of our most vulnerable sites was assessed to help us initiate the process.

# PHYSICAL RISKS CONTINUED

## PHYSICAL CLIMATE-RELATED RISKS

	<p><b>PRECIPITATION</b> Maximum daily precipitation (in mm) for a predefined event.</p>	 <p><b>FLOOD</b> Includes fluvial, riverine and pluvial floods. The risk score is based on changes in precipitation patterns as well as other components such as topography, catchment area and runoff.</p>	 <p><b>WIND</b> Extreme daily wind based on the probability of exceeding a daily mean value of 12 m/s. The score does not include extratropical cyclones or tropical cyclones.</p>
	<p><b>WILDFIRE</b> Likelihood of wildfire based on current land susceptibility to fire and projected hot and dry weather</p>	 <p><b>DROUGHT</b> Water stress locations based on the Standardized Precipitation Index (SPI) in combination with the number of heat wave days.</p>	 <p><b>HEAT</b> Combination of atmospheric water capacity, change in extreme temperature, and increase in number of dry days.</p>

○ Acute ○ Chronic

Temperature Change	IPCC Scenario	2025	2030	2050
1.5–2°C	RCP 2.6	✓	✓	✓
2–3°C	RCP 4.5	✓	✓	✓
>4°C	RCP 8.5	✓	✓	✓

Representative concentration pathway (RCP 2.6, RCP 4.5, RCP 8.5)  
Intergovernmental Panel on Climate Change

## IMPACTS ON OUR ASSETS

As an example for the 62 sites assessed, a short overview of the driving perils of four locations selected by Holcim scattered around the world is summarized below. These four locations are selected to show that every region and location has different driving perils, and they can evolve differently in the future with climate change. The insights are used by Holcim to understand the current risk situation and assess future risk for different scenarios, helping Holcim to manage respective risks accordingly.

Considering Holcim’s locations to be mostly extraction and processing of raw materials, the perils that can mostly impact the business operations are heat wave, flood, and extreme precipitation. For a below 2°C scenario, the risk of

heat waves remains similar to the current risk, however at above 4°C it increases notably in the future. Despite this, it is expected that most buildings and areas placed manufacturing sites are air-conditioned, which mitigates the risk of heat waves to cause business interruptions or reduced efficiency. Climate models indicate that the flood risk will remain rather constant in the future across all climate scenarios, and only five of 62 locations will likely experience a decisive increase in flood risk. Extreme precipitation could become enhanced for about half of Holcim’s locations, especially if global temperatures rise above 4°C compared to the pre-industrial era.

## LOCATIONS FOR PHYSICAL CLIMATE-RELATED RISKS SCENARIO ANALYSIS

### THEODORE, US

Currently, the Theodore plant is impacted by heavy storms and wind, with a high risk of lightning and moderate risk of wildfire. With climate change, storm surge and extreme precipitation will increase. Droughts and heat waves are also expected to increase for this location. Due to its elevation and the flood protection measures in place, riverine flooding is not expected to be a significant risk.

### MACUSPANA, MEXICO

The driving perils are fluvial flood and extreme precipitation with both very high risk, followed by drought, heat stress and lightning with high risk. For the future it is expected that the risk of fluvial flood will further increase, as well as the risk of drought, heat stress and heat waves.

### SYLHET, BANGLADESH

Sylhet is currently at significant to very high risk of fluvial floods, extreme precipitation, hail, lightning and tornadoes.

The risks of fluvial flood and extreme precipitation are expected to increase with climate change.

Heat waves and heat stress, by comparison, will only moderately increase, given the already high level of impacts.

### UNTERVAZ, SWITZERLAND

In Untervaz, the majority of the high to very high risks are water-related risks, such as extreme precipitation flooding. Additionally, there is a high risk of cold wave/frost and drought.

While for the future the risk of pluvial and fluvial flood will increase only marginally, it is expected that heat wave, heat stress and droughts will become longer and more intense.

## IMPACTS ON OUR SUPPLY CHAIN

The disruption of supply chains by climate extremes can pose a significant threat to Holcim's business operations. An example of this is the Mississippi River, which acts as an important waterway for Holcim to efficiently and affordably transport products to distributors and construction sites. The river basin has a long history of droughts and floods that affected economic activities along the Mississippi River (e.g. flooding in April 2011 and the drought in 2021). High and low water levels can impede planned transportation schedules causing delays. This results in business interruptions and additional costs. The vulnerability of the Mississippi transport system to climate extremes is amplified by an aging infrastructure and climate change. An increasing trend of spring time high water level extremes has already been observed over the past two decades compared to pre-1990

water levels. Based on a likely increase in precipitation extremes with a changing climate, high water levels are expected to occur more frequently in both a 2°C and 4°C scenario by 2050. Low water level extremes will likely occur more frequently in 2°C scenarios but decrease in a 4°C world. Hence, in the near term, the drought-flood variability will be a considerable challenge, while in the long-term, high water levels will dominate the supply chain risk.

## OPPORTUNITIES

A range of opportunities can be seen twofold, either as a reduction in the implications of perils or as an increase in the demand for Holcim's products. In terms of the latter, opportunities may arise from physical climate risks that result in an increased demand for sustainable resilient construction material.

# SCENARIO ANALYSIS

Holcim has developed two distinct and plausible climate change scenarios, including one adhering to the Paris Agreement, to test the resiliency of the organization in different climate change futures.

As part of Holcim's aim to align with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations, the Group has continued to develop distinct and plausible climate change scenarios to test the resilience of the organization in different climate change futures. Two scenarios have been considered to present Holcim's assessment on climate related transitional and physical risks. A "Paris Agreement-aligned" scenario (1.5°C) and an "Ineffective Collective Action Against Climate Change" scenario (2.7°C–4.4°C scenario).

The Paris Agreement-aligned scenario is favorable for Holcim, its shareholders and the global community. New market conditions will support a growing demand for low-carbon products and solutions, increasing our market share in the range of low carbon products and solutions. Holcim's sustainability leadership brings strategic resilience to the Group, and Holcim is well positioned to build on its net-zero journey and help create a net-zero future that works for people and the planet.

A lower pace of transformation will lead to an "Ineffective Collective Action Against Climate Change" scenario, as the construction value chain continues to be fragmented and stimuli are not in place to decarbonize at the pace and scale required. While this is not Holcim's strategic direction, the group will adapt to cover the market needs while continuing to drive circular and low carbon construction.

In all cases, Holcim is well positioned for the future, with its Ready-Mix Concrete business and the expansion in Solutions & Products. Concrete is versatile, affordable, insulating and infinitely recyclable. In addition, it is resilient, durable, fire and earthquake resistant, protecting our cities and infrastructure from natural disasters. For all these reasons, concrete is a must for climate change adaptation and currently there is no viable substitute at scale.

This chapter aims to summarize the outcome of this analysis. Holcim will continue to develop its climate scenarios analysis to understand emerging opportunities and mitigate potential risks associated with climate change.

Holcim considers in this assessment the impact of each scenario on our ambition to become a net-zero company by 2050 and a leader in sustainable construction material, thus delivering a profitable growth in a low-carbon economy. Depending on the risk or opportunity, this assessment embraces either a quantitative assessment of our ability to deliver our Strategy 2025 or a qualitative assessment of the impacts on our reputation and credibility to stakeholders. These scenarios do not constitute definitive outcomes for Holcim. This scenario analysis exercise relies on assumptions that may or may not eventuate, and scenarios may be impacted by additional factors to the assumptions disclosed.



## Paris agreement-aligned scenarios

In the Paris Agreement-aligned scenario, Governments and industries are aligned to make carbon neutrality possible. The cement industry is making significant efforts toward net-zero development and innovation, while climate change mitigation and adaptation have a growing importance. Carbon capture, utilization and storage technologies are developing at a pace consistent with the industry's transition to net-zero. Demand for low-carbon and material-efficient solutions and those that mitigate the impacts of climate change accelerates. Physical impacts of climate change are manageable without significant business or societal disruption. Holcim's sustainability leadership brings strategic resilience to the company. Holcim is well positioned to build on its net-zero journey and build a net-zero future that works for people and the planet.

## Ineffective collective action against climate change scenario

Ineffective collective action against climate change creates a misalignment between our efforts to reach net-zero emissions and the applicable regulations, resulting in a competitive disadvantage that a zero-carbon strategy imposes on our company compared to other sectors. Limited benefit would be taken from the development of low-carbon and material and energy-efficient solutions. Physical impacts of climate change are severe including water stress and extreme weather events. Holcim develops a strong response strategy in order to protect its assets and adapt to new market demand features.

◀ McLaren Technology Center, UK with Elevate's RubberGard



◀ Eight Gardens, London that has ECOPact low-carbon concrete inside with 64 percent lower CO<sub>2</sub>

# SCENARIO ANALYSIS CONTINUED

● Risk to be watched continuously by Holcim and risk governance to be adjusted accordingly to limit negative business impact. ● Opportunity improving the conditions to deliver our strategy and having a positive business impact.


**IMPACT LOW**  
**IMPACT MEDIUM**  
**IMPACT HIGH**

		PARIS AGREEMENT-ALIGNED SCENARIO		INEFFECTIVE COLLECTIVE ACTION	
		RISKS	OPPORTUNITIES	RISKS	OPPORTUNITIES
<b>1. POLICY AND LEGAL</b>					
1.1 CO <sub>2</sub> prices and other climate policies	2030				
	2050				
<b>2. MARKET</b>					
2.1 Access to mineral components	2030				
	2050				
2.2 Cost of fossil fuels/energy	2030				
	2050				
2.3 Circular construction (recycling materials, smart design and driving repair and renovation)	2030				
	2050				
2.4 Demand for low-carbon building materials	2030				
	2050				
<b>3. TECHNOLOGY</b>					
3.1 Decarbonization of supply chain (energy and transportation)	2030				
	2050				
3.2 Deployment of breakthrough technologies at a large scale	2030				
	2050				
<b>4. REPUTATION</b>					
4.1 Impact on Group's stakeholders	2030				
	2050				
<b>5. PHYSICAL</b>					
5.1 Chronic – higher average temperatures and sea level rise	2030				
	2050				
5.2 Acute – extreme events (flooding and heat)	2030				
	2050				

## PARIS AGREEMENT-ALIGNED SCENARIO

## INEFFECTIVE COLLECTIVE ACTION AGAINST CLIMATE CHANGE SCENARIO

### 1. POLICY AND LEGAL

Consistent with our net-zero strategy, reliable and stable carbon prices in all regions facilitates long-term investment decisions in low-carbon technologies and encourages significant changes across the building material and construction value chain. It will also support the collective effort to create a CO<sub>2</sub> transportation and storage network at a large scale in line with the needs of other industries.

A limited number of CO<sub>2</sub> pricing schemes hampers the deployment of breakthrough technologies at the pace needed, making it more challenging for Holcim to deliver on its net-zero target. Also, with fragmented decarbonization efforts in the construction value chain, it is more difficult to benefit from the competitive advantage coming from a low-carbon footprint.

### 2. MARKET

While decarbonization of the construction value chain progresses, focus is on reducing operational emissions in the built environment, and circular construction is progressively endorsed by norms and regulations globally. This results in a higher demand of low-carbon and circular building materials and of our Solutions and Products segment. Simultaneously, as the cement, steel and energy industry decarbonize, the availability of supplementary materials such as fly ash or slag decreases. Holcim mitigates this risk by securing respective sources of limestone, construction and demolition waste or byproducts from other industries but also by investing in calcined clay facilities and developing novel cements with new binders. By the progressive transition to greener energy sources, Holcim's dependency on fossil fuel decreases.

As there are few regulatory incentives to use low-carbon products and to recycle, there is a limited increase in the sales of our low-carbon cement and concrete. The demand of our circular materials and our products and solutions will be driven by urbanization, the need to protect natural resources, and increased fossil fuel prices. By 2030, while the average clinker factor will reduce moderately, the availability and costs of mineral components will remain virtually unchanged compared to today's levels. By 2050, the price of these materials timidly increases slightly as some decarbonization of industries is underway leading to a limited negative impact. On the other hand, with the slower transition to greener energy sources, the demand for fossil fuels remains strong.

### 3. TECHNOLOGY

Holcim will profit from the overall decarbonization efforts in society due to a) the earlier readiness and affordability of breakthrough technologies, such as kiln electrification, hydrogen and most importantly CCUS; and b) efforts in our own value chain/suppliers, which will reduce our Scope 3 emissions. Additionally, we will expect supplementary cementitious materials like calcined clay to become mature.

Significant additional efforts will be needed from Holcim to reach its Scope 1 targets as governments are slow in implementing the necessary policies to scale up breakthrough technologies such as kiln electrification, hydrogen and CCUS and the network and infrastructure around it. Scope 3 targets are challenged as suppliers do not decarbonize at the necessary pace.

### 4. REPUTATION

In the short term, Holcim's cement production segment remains in the spotlight as a CO<sub>2</sub> intensive business, bringing reputational risks. However, as the net-zero roadmap is delivered and Holcim is seen as a keen contributor to mitigate climate change, its reputation, trust and credibility grows and the strategy is aligned with the expectations of a 1.5°C world.

The slow pace in required regulatory incentives will bring additional challenges to Holcim's decarbonization journey, increasing progressively the respective reputational risks.

### 5. PHYSICAL

Extreme precipitation and flooding impacting sites and supply chains in affected areas will require further protective measures and mitigation plans. Today, 30 percent of our sites are located in areas with medium to extremely high water stress, which explains why appropriate governance and management in water consumption, recycling and treatment are already required today.

Extreme weather events like extreme precipitation, flooding and excessive heat days will increase significantly in frequency and intensity. In the long term, these may be significantly intense to make protection measures at existing locations insufficient, hence having a severe financial impact on sites and supply chains. Further risks, such as wildfire and windstorms, will increase and become significant threats.

# JUST TRANSITION

We take a whole-society approach toward reaching net-zero, respecting human rights while creating decent work and good jobs.

In the absence of a universal framework for a just transition, we engaged with external provider DNV to develop our own. Our aim is to assess the impacts of our journey to net zero on four key

stakeholder groups: our people, our suppliers, our communities and our customers.

## CARING FOR OUR PEOPLE

We are committed to creating a high-performance culture of empowerment, lifelong learning and development. We aim for all employees to develop their skills in a way that helps us achieve our green growth ambitions while they continue to thrive.

For example, we aim to advance the use of calcined clay and other mineral components for our ECOPlanet and ECOPact ranges of low-carbon cement and concrete. Employment in cement production will therefore continue and those skills will continue to be of significant value in reaching net-zero. We also anticipate expanding roles in pre and co-processing of waste for fuels and alternative raw materials, especially with regard to construction and demolition waste.

Other key decarbonization measures fall under our Plants of Tomorrow initiative, which is introducing Industry 4.0 technologies across our global footprint. Our culture of lifelong learning and development will ensure our workers have the appropriate skills and knowledge to adapt to these changing technologies. The Plants of Tomorrow initiative should also help overcome challenges in filling the talent gap.

In the longer term we will expand our use of next-generation technologies, such as Carbon Capture, Utilization and Storage (CCUS). These technologies will create high-value opportunities for our workforce.



**“It is empowering to be part of the team making our solutions more technologically advanced, operationally efficient and low-carbon.”**

**MILLICENT SIWELE**  
Process and Environmental Manager,  
South Africa

## OUR SUPPLIERS

Our supply chain will change as a result of our transition to net-zero. For example, our needs for raw materials will shift toward alternatives such as construction and demolition waste. We will also expand into new business lines, such as roofing and insulation. Along this transition we remain committed to building long-term partnerships with suppliers who share our goals of addressing climate change, driving a circular economy and improving living standards for all. We also remain committed to a just transition for all the suppliers we work with.

That commitment is framed across three main pillars:

### Respecting human rights

Responsible business conduct is an integral part of our procurement strategy. We actively monitor and verify compliance with our Supplier Code of Conduct. Our Code is based on the UN Global Compact, OECD Guidelines for Multinational Enterprises, UN Guiding Principles on Business and Human Rights, and the International Labour Organization's Declaration on Fundamental Principles and Rights at Work. Due diligence is carried out in every market where we operate to identify, prevent and address human rights breaches.

### Promoting health and safety

Holcim is committed to conducting business with zero harm to people and to creating a healthy and safe environment for our employees, contractors, communities and customers. We take a systematic approach to health and safety management within our supply chain, verifying compliance with applicable standards and regulations. Suppliers and contractors are selected based on their demonstrated qualifications in these areas. Ongoing training and performance monitoring enables effective management of health, safety and well-being. Holcim is a signatory of the WASH Pledge, ensuring we demonstrate best practices on WASH (access to water, sanitation and hygiene) and take action across our value chain.

### Collaborating with suppliers

We partner with key suppliers to decarbonize our supply chain. We enable multi-stakeholder platforms to accelerate the adoption of decarbonized technologies, such as electric trucks. This is especially important in road transport, as the great majority of our trucking partners are third parties. For this reason we are building an ecosystem for low-carbon mobility suppliers and financing partners to work with our trucking providers, giving them greater visibility to plan their own decarbonization roadmap.



### DID YOU KNOW 3D PRINTING

3D construction printing offers four key benefits of automation, speed, sustainability and design freedom. We are using smart design with 3D printing to build better with less reducing materials by up to 50 percent. With 3D printing we are creating high value, technologically advanced jobs which are replacing some traditional construction roles. This automation is helping to mitigate critical labor shortages in mature markets such as Europe and North America. Technology advancements with 3D printing will ensure the construction industry can attract and retain the talent required to lead decarbonizing building across the value chain.

The speed that 3D printing offers is key to solving the critical infrastructure shortages,

such as with 1.6 billion people who lack adequate housing and infrastructure in the world today. These problems are most acute in emerging markets. In Malawi there is a need to build more than 36,000 classrooms and at today's pace, using traditional construction methods, it would take more than 70 years. In 2021, 14Trees, our award winning joint venture with the UK's British International Investment Group, built the first 3D-printed school in Malawi and in January 2023 completed the 10-unit Phase 1 of the Mvule Gardens 52 home affordable housing project in Kenya. 3D printing creates high value jobs in emerging markets without competing with traditional construction methods, both will have a key role in filling the crucial infrastructure gaps.

# JUST TRANSITION CONTINUED

## OUR CUSTOMERS

We are at the forefront of decarbonizing building throughout its lifecycle to ensure a net-zero future, building progress for people and the planet.

### BUILDING BETTER WITH LESS

With our world's rising population and urbanization, Holcim is building better with less to improve living standards for all and build a net-zero future.

The key to decarbonizing construction is developing low-carbon materials and using smart design.

Since concrete is sustainable, versatile and resilient, we are continually innovating to make low carbon concrete the building material for a

net-zero future. Our ECOPact concrete offers significant CO<sub>2</sub> reductions without compromising on performance and is available in 29 markets across all regions. It is key to development projects across the globe from affordable housing and key infrastructure developments like the Iconic Tower in Egypt and the award winning Slough Multifuel energy-from-waste (EfW) facility in the UK.

### DECARBONIZING CITIES

Holcim solutions help decarbonize cities, from flooring and insulation to advanced mortars and green retrofitting. We are becoming a global leader in roofing with systems spanning cool, green and solar-enabling roofs.

## HOLCIM'S FRAMEWORK FOR A JUST TRANSITION

The framework we developed with DNV is informed by various guidelines and initiatives. That begins with the ILO's Just Transition guidance, with its focus on **workers**, as well as the Paris Agreement's focus on **communities and stakeholder engagement**. We also considered:

- The Just Transition Dialogue Report by the Institute for Human Rights and Business (IHRB) and Wilton Park, namely:
  - Risks and Impacts
  - Opportunities and Benefits
  - Agency and Accountability
- Key stakeholder groups identified as per the London School of Economics' Grantham Research Institute on Climate Change and the Environment in their "Translating just transition ambitions into investor action" policy report, namely:
  - Workers
  - Supplier
  - Communities
  - Consumers/Customers

- Just transition indicators presented by the World Benchmarking Alliance's Just Transition Methodology, considering ISO 26000 and United Nations Guiding Principles on Business and Human Rights

Our just transition considerations, framework and commitments will continue to evolve as it becomes embedded in our climate strategy and external guidelines advance.

## OUR COMMUNITIES

At Holcim, we are on our journey to promote sustainable development through innovative building materials and solutions. We remain fully committed to creating a positive social impact in the communities where we operate.

### ADDRESSING A VITAL NEED FOR PEOPLE

Approximately 1.6 billion people lack adequate housing and infrastructure. We partner with communities and governments around the world to address this pressing issue, which is expected to become more urgent as a consequence of climate change.

Our experts develop innovative low-carbon solutions that bridge the gap in affordable housing and infrastructure. This benefits people and communities globally while contributing to the success of our business.

Low carbon partner with organizations who share our goal of building affordable housing, such as Habitat for Humanity. We are a founding member of the Roof Over Our Heads campaign, which aims to improve the lives of 2 billion climate vulnerable people living in informal settlements by 2050.

### RESPECT FOR HUMAN RIGHTS

Holcim is committed to respecting and promoting human and labor rights in our operations and in the communities where we work. Our Human Rights and Social Policy and Human Rights Directive set out our aims, methodology, processes and risks. These guidelines, developed after extensive consultation with global managers, staff, external human rights experts and civil society and community representatives, are aligned with the UN Guiding Principles on Business and Human Rights and the OECD Guidelines for Multinational Enterprises.

### STAKEHOLDER ENGAGEMENT

We speak to stakeholders regularly to build trust, understand expectations, listen to grievances and explain company positions, including our positions on our transition to net-zero. Every site has a locally managed stakeholder map and engagement plan in place. All our cement plants and grinding units have a Community Advisory Panel that ensures regular exchanges with community representatives. Engagement with relevant stakeholders is also mandatory in the planning stage of a new development.

Regular engagement with stakeholders from customers to communities, employees to NGOs helps us to better communicate how our business activities, as well as our sustainability performance, are likely to affect our stakeholders. The dialogue also allows us to better understand our stakeholders' perspectives and provide opportunities to co-create solutions that are to the benefit of all stakeholders and that our climate strategy results in a just transition.

### MAKING BUILDING SUSTAINABLE

Concrete will remain the building material of choice due to its unmatched performance benefits of strength flexibility and low cost. These characteristics will be key to protect our communities as they adapt to climate change.



**“As our plant’s Environment Officer I get to work with our communities, the government and external stakeholders on efforts to care for the environment in our operations.**

**One of the things I enjoy the most in this role is our best practices program, through which we bring all stakeholders together to protect nature.”**

#### **MICHELLE TRAZONA**

Environment Officer, Philippines

# ADVOCACY POSITIONS AND TRANSPARENCY

Globally, the political and industrial agenda is firmly moving towards one of green growth. Initiatives such as Europe's Green Deal and the US Inflation Reduction Action are anchored on decoupling economic growth from carbon emissions and resource use.

At Holcim, our "Strategy 2025 – Accelerating Green Growth" and beyond are fully aligned with such initiatives:

- **We put decarbonization at the heart of our industrial and commercial strategy** from the deployment of Carbon Capture Utilization and Storage (CCUS) technologies to low-carbon solutions such as ECOPact.
- **We drive circular construction to build better with less** Recycling construction and demolition waste and enabling smart technology, such as 3D printing that reduces the use of materials by up to 50 percent.
- **We develop solutions to make cities greener from foundation to rooftop** and empower society with smarter infrastructure.

This journey requires radical collaboration with our entire value chain and with regulators. In particular we need regulatory frameworks that:

- **Help us build the business case to invest at scale in decarbonized technologies** (e.g. competitive access to decarbonized energy / facilitated access to funding / viable framework for the reuse of industrial CO<sub>2</sub>).
- **Lead to market demand for decarbonized and circular solutions** (e.g. harmonized products standards / ambitious building codes such as the French Environmental Regulation in 2020 / public procurement that is technology neutral, based on lifecycle performance and not material specific in order to drive innovation).
- **Enable industry to remain competitive on the global stage** (e.g. international level playing field on carbon costs / fair state aid rule for energy-intensive sectors / dynamic carbon pricing).

## CARBON CAPTURE UTILIZATION AND STORAGE (CCUS)

The European regulatory framework that is currently being developed will play a fundamental role in enabling the CCUS industry to be the central engine of this low carbon and circular transition. One decarbonization lever that is fundamental to the sector's transition is CCUS. No single solution will be perfectly scalable everywhere as different environments present different conditions (e.g. technological, geological and legislative) that will be favorable for one solution or another. This requires a flexible yet unequivocal regulatory framework:

- **Recognizing carbon use**  
As an integral part of the transition to net zero is a necessity as is avoiding the design of restrictive regulatory frameworks that prevent the scale-up of industrial carbon capture projects. Policies under development (e.g. on synthetic fuels in EU) cast serious doubts on the future of CO<sub>2</sub> utilization from industrial sources, without any serious impact assessment.
- **A dynamic, accessible and competitive value chain for CO<sub>2</sub> transport and storage**  
Europe must focus on securing accessible infrastructure for carbon capture, transport and storage. The current monopolistic environment threatens the viability of many projects that would otherwise be implemented before 2030 and which require planning, permitting and financing now.
- **European Innovation Fund and CCUS**  
In 2022, Holcim secured two investments from the European Union (EU) Innovation Fund for breakthrough CCUS projects in Germany and Poland. Both projects feature scalable technologies to put Holcim at the forefront of Europe's decarbonization. Holcim's cement

plant in Lägerdorf, Germany, received EUR 110m and is part of the “Carbon 2 Business” industry collaboration and uses Oxyfuel technology and carbon capture for further processing into methanol fuel or as raw material in the chemical industry. The EU provided funding of EUR 228m to Holcim’s Go4ECOPlanet project in Poland, which aims to create an end-to-end Carbon Capture and Storage (CCS) chain starting from CO<sub>2</sub> capture from its site in Kujawy to offshore storage in the North Sea, with the vision to be a net-zero plant by 2027. We are working on further investment to enable the expansion and acceleration of our CCUS strategy.

## MARKET DEMAND FOR LOW CARBON PRODUCTS AND SOLUTIONS

Holcim is committed to leading the transition toward low-carbon and circular construction by developing and introducing green products and solutions worldwide. In most cases, introducing them to the market requires an adapted product standard and its use must be facilitated by building codes and (public) procurement practices in order to create market demand.

- **Create market demand through a dynamic standardization and public procurement framework.** Having standards in place and implemented swiftly is fundamental to start building a supply-demand momentum in the value chain that can be supported by (public) procurement practices and building codes.
- **The use of harmonized product standards remains the most appropriate approach.** In Europe, our experience with EN 197-6 for the use of recycled concrete fines in cement shows that a non-harmonized approach hampers effectiveness, speed of deployment and cross-country optimization within the single market. All difficulties encountered nowadays to make applicable harmonized standards should be solved in close cooperation with industry as soon as possible without unnecessary legal complexity nor multiplication of regulations. We fully support the Biden administration’s establishment of lower emission standards through executive orders like Buy Clean. Our products can help them reach their targets with our industry-leading green building solutions.

## CARBON BORDER ADJUSTMENT MECHANISM (CBAM)

**A fast and “watertight” implementation is key to its success.** A swift implementation of the CBAM will provide the necessary foundations for large scale investments in the decarbonization of our activities and products across the EU. It requires close collaboration with the sectors concerned, in

order to make sure that adequate (existing) standards are used (eg. on GHG measurement, monitoring and reporting) and all potential circumvention routes are effectively closed. This process is fundamental to ensuring effective CO<sub>2</sub> cost equalization.

## LIFE CYCLE PERFORMANCE AS BASIS FOR THE FUTURE OF CONSTRUCTION

**Decarbonizing construction and making the value chain truly circular does not rely on a single technology or sub-sector.** All materials and all technologies are part of the solution.

A policy framework and vision is needed that is based on technology neutrality and lifecycle performance. Defining the lifecycle performance that needs to be achieved to be aligned with 1.5°C will lead to a dynamic market based on innovation and performance.

An example is the French Environmental Regulation 2020 building code that has introduced carbon footprint thresholds on the construction part from 1 January 2022. This lifecycle methodology makes the French market structured around the CO<sub>2</sub> performance at the build scale which allows us to accelerate the deployment of low carbon solutions.

## ENERGY

Access to competitive decarbonized energy is a critical enabler to the decarbonization of the industry:

- **A well-functioning and interconnected electricity market** where there is access to decarbonized energy at scale and at competitive prices is the cornerstone for the decarbonization of European industry and its short and long-term competitiveness.
- **Investments in renewable energy assets should be facilitated** through faster permitting procedures, including for the development of renewable assets in industrial contexts.
- **Industry also requires continued access to non-recyclable waste** and biomass waste. These resources currently supply a large proportion of the cement sector’s fuel needs, allowing it to become less dependent on imported fossil fuels while decarbonizing our processes.

## FUNDING FOR DECARBONIZED INDUSTRIAL GROWTH

In order to build strong business cases and ensure the deployment of low carbon technology, industry requires access to combined sources of funding. This can be facilitated through:

# ADVOCACY CONTINUED

- **A simplified application and approval process** to funding sources, allowing transparent and easy access. A shift to direct funding of CCUS for the cement industry can accelerate the construction phase of CCUS projects and hence the decarbonization in the US plants.
- **In Europe, a swift deployment of Carbon Contracts for Difference (CCFDs)** at EU and national level to allow for a de-risking of projects based on access criteria that are simple and fast in execution.

## TRADE ASSOCIATION CLIMATE REVIEW

Our commitment to climate related reporting is transparent and rigorous and we take the same approach in our advocacy positions.

Aligned with our net-zero pledge, Holcim is committed to ensure that our direct and indirect lobbying through trade associations are aligned with the Paris Agreement and Holcim's positions outlined below.

- Support of the Paris Agreement's climate targets and net-zero agenda.
- Support of the use of carbon pricing mechanisms.
- Development of an industry roadmap to net-zero.
- Acknowledgement of the need of advanced technologies, including CCUS, to further decarbonize (mainly for cement industry associations).
- Support of the need to introduce low-carbon and/or net-zero products on the market.

We selected the most significant organizations, ensuring a balanced geographical distribution and including global, regional and national organizations, together representing represent c. 80% of the total amount that the Group paid to trade organizations in 2022.

The organizations were assessed by reviewing their public positions using their website, media releases, publications, social media, questionnaires and, when needed, discussions with the local teams.

We recognize that the journey to net zero requires radical collaboration across our entire value chain and with regulators, investors, NGOs, civil societies and employees. We are committed to work with these stakeholders and our trade associations to accelerate that journey. Where any

selected organizations had material misalignment or diverging views with Holcim's policy positions and could not be considered to be part of the acceleration to net zero we will dissociate ourself from the trade association and related activities or, in extreme cases, renounce its mandates within the organization and/or its membership.

After this review, we pursued our work with all the organizations included in the scope to close the gaps and push for more alignment with our positions and commitments on Climate Policies. As a result, five out of nine organizations that had not developed net-zero roadmaps 2 years ago, have now issued and published their roadmaps, while two are no longer associated with Holcim. Two organizations that did not formally declare their support to the Paris agreement have formalized their positions since. We will continue to assess the climate policy positions of our trade association memberships on a periodic basis.

## CASE STUDY: HOLCIM CLIMATE-RELATED LOBBYING ACTIVITIES IN 2022

As part of its activities to advocate global emissions reductions and the reaching of the Paris Agreement, in 2022 Holcim attended COP27 with the participation of our various team members (including Holcim's Chief Sustainability and Innovation Officer) in various panel discussions and roundtables regarding the decarbonization of the built environment, industrial decarbonisation and the rolling-out of next generation technologies and circular cities. In 2022, our CEO was mobilized on the occasion of the New York Climate Week, advocating for the collaboration of all sectors in decarbonizing cities and supporting ambitious climate-focused policies such as support for the US Inflation Reduction Act (IRA).

Throughout 2023 we were actively involved in the work of recognized and leading organizations on sustainable construction, industrial decarbonisation and the decarbonisation of the built environment. This includes the World Business Council for Sustainable Development (WBCSD), the World Green Building Council (WGBC), UNIDO's Industrial Deep Decarbonisation Initiative (IDDI) or the Leadership Group for Industrial Decarbonisation (LeadIT).

Holcim has signed the UN Global Compact, supporting its ten principles on human rights, labor, environment and anti-corruption. In parallel to our role as a global leader, we engage bilaterally in our markets with governments on climate policy agenda.

Holcim has driven decarbonization discussions in Industry Trade Associations such as Cembureau in Europe and Global Cement and Concrete Association at a global level. We are actively engaged in the development of an ambitious climate policy framework globally, at regional levels (e.g. Europe) and national levels (e.g. USA). Some of the topics that Holcim engages on include carbon capture, utilization and storage (CCUS) related policies, carbon pricing schemes, the development of competitive decarbonised energy networks, the achievement of common

definitions and standards of low-carbon cement (within our industry and with external organisations such as the First Movers Coalition of Concrete Zero). We are actively advocating for public procurement frameworks to embed low carbon and circular solutions. In Europe, we have actively engaged and supported the development of the EU's Carbon Border Adjustment Mechanism (CBMA, both as Holcim and through our European Trade association Cembureau).

# ADVOCACY CONTINUED

## SUMMARY OF ORGANIZATIONS AND POSITIONS

	SUPPORTS PARIS AGREEMENT AND NET-ZERO AGENDA	SUPPORTS CARBON PRICING MECHANISMS	EXISTENCE OF A NET-ZERO ROADMAP	RECOGNIZES THE NEED OF ADVANCED TECHNOLOGIES, INCLUDING CCUS	SUPPORTS INTRODUCTION OF LOW-CARBON AND/OR NET-ZERO PRODUCTS
<b>WORLDWIDE</b> GCCA	● Yes	● Yes	● Work in progress	● Yes	● Yes
<b>EU</b> CEMBUREAU	● Yes	● Yes	● Yes	● Yes	● Yes
<b>SWITZERLAND</b> CEMSUISSE	● Yes	● Yes	● Work in progress	● Yes	● Yes
<b>SWITZERLAND</b> ECONOMIESUISSE	● Yes	● Yes	● No formal roadmap but net-zero commitment to 2050	● Yes	● Yes
<b>UK</b> MPA	● Yes	● Yes	● Yes	● Yes	● Yes
<b>BELGIUM</b> FEBELCEM	● Yes	● Yes	● Yes	● Yes	● Yes
<b>SPAIN</b> OFICEMEN	● Yes	● Yes	● Yes	● Yes	● Yes
<b>FRANCE</b> SFIC	● Yes	● Yes	● Yes	● Yes	● Yes
<b>FRANCE</b> UNICEM	● Yes	● Yes	● Not relevant	● Not relevant	● Yes
<b>GERMANY</b> VDZ	● Yes	● Yes	● Yes	● Yes	● Yes
<b>POLAND</b> SPC	● Yes	● Yes	● Yes	● Yes	● Yes
<b>AUSTRIA</b> VÖZ	● Yes	● Yes	● Yes	● Yes	● Yes
<b>US</b> NRMCA	● Yes	● Yes	● Yes	● Yes	● Yes
<b>CANADA</b> CAC	● Yes	● Yes	● Yes	● Yes	● Yes
<b>BRAZIL</b> SNIC	● Yes	● Yes	● Roadmap with PA 2°C scenario for cement	● Yes	● Yes
<b>AUSTRALIA</b> CCAA	● Yes	● Not formal position given policy context	● No formal position	● Yes	● Yes
<b>NEW ZEALAND</b> CONCRETE NZ	● Yes	● Yes	● Yes	● Yes	● Yes
<b>PHILIPPINES</b> CEMAP	● Yes	● No formal position	● No	● No formal position	● Yes

# CLIMATE-RELATED METRICS

We follow a science based, rigorous and transparent approach to climate strategy and to sustainability reporting. The carbon related indicators use the Global Cement and Concrete Association (GCCA) Sustainability Guidelines for the monitoring and reporting of CO<sub>2</sub> emissions from cement manufacturing and are aligned with

GHG Protocols. The climate related indicators above and those contained in the Sustainability Performance Report are audited annually and subject to limited assurance by EY. Please refer to page 19 and 20 of the Sustainability Performance Report for EY's assurance statement.

## GHG EMISSIONS - INTENSITY

		2020	2021	2022
CEM specific CO <sub>2</sub> emissions – net (Scope 1)	KG CO <sub>2</sub> /T	575	572	562
CEM specific CO <sub>2</sub> emissions – gross (Scope 1)	KG CO <sub>2</sub> /T	613	609	602
CEM CO <sub>2</sub> emissions – electricity (Scope 2)	KG CO <sub>2</sub> /T	42	39	37

## GHG EMISSIONS - ABSOLUTE

		2020	2021	2022
Absolute Scope 1 emissions – gross – cement only	MT	75	79	77
Absolute Scope 1 emissions – net – cement only	MT	71	74	72
Absolute Scope 1 emissions – gross	MT	76	81	78
Absolute Scope 2 emissions	MT	5	5	5
Absolute Scope 3 emissions – total	MT	52	53	47
• Absolute Scope 3 emissions – upstream	MT	20	20	20
• Absolute Scope 3 emissions – downstream	MT	6	6	5
• Absolute Scope 3 emissions – investments	MT	26	27	23

## ALTERNATIVE RAW MATERIALS AND WASTE

		2020	2021	2022
Extended clinker factor	%	73.9	73.6	73.0
Alternative raw materials contained in cement	%	7	8.3	9.3
Circularity ratio – cement (waste used / production volumes)	%	–	19	20
Construction and demolition waste (CDW) used	MT	–	6.6	6.8
Waste-derived resources – all segments	MT	28	31	34

## ENERGY CONSUMPTION

		2020	2021	2022
Specific heat consumption of clinker production	MJ/T	3,630	3,640	3,654
CEM thermal energy consumption	M GJ	339	364	356
CEM thermal energy mix – traditional fuels	%	75	74	73
• CEM thermal energy mix: coal	%	19	25	19
• CEM thermal energy mix: petcoke	%	31	22	23
• CEM thermal energy mix: oil	%	4	4	4
• CEM thermal energy mix: gas	%	19	21	23
• CEM thermal energy mix: other traditional fossil fuels	%	2	2	2
CEM Thermal Substitution Rate (TSR):				
alternative fuels plus biomass	%	25	26	28
• CEM thermal energy mix: alternative fuels (ex biomass)	%	17	17	18
• CEM thermal energy mix: biomass	%	8	9	10
CEM electrical energy consumption	M GJ	47	50	51
• CEM electrical energy (renewable)	M GJ	8	11	14
• CEM electrical energy (non-renewable)	M GJ	39	39	36
CEM energy consumption total	M GJ	386	414	407
Other segments thermal energy	M GJ	26	20	20
Other segments electrical energy	M GJ	3	3	4

All prior year figures above are restated, based on the 2022 consolidation scope, and may differ from the figures reported in the Sustainability Performance Report which are disclosed, "as reported" in the relevant reporting year.

## ABOUT HOLCIM

Holcim is a global leader in innovative and sustainable building solutions. Driven by its purpose to build progress for people and the planet, its 60,000 employees are on a mission to decarbonize building, while improving living standards for all. The company empowers its customers across all regions to build better with less, with its broad range of low-carbon and circular solutions, from ECOPact to ECOPlanet. With its innovative systems, from

Elevate's roofing to PRB's insulation, Holcim makes buildings more sustainable in use, driving energy efficiency and green retrofitting. With sustainability at the core of its strategy, Holcim is becoming a net-zero company with 1.5°C targets validated by the Science Based Targets initiative (SBTi).

More information is available on [holcim.com](https://www.holcim.com)

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Holcim's sustainability leadership recognized by CDP with a double "A" ranking for climate and water.



In 2022 the SBTi validated that Holcim's updated 2030 targets are aligned with a 1.5°C scenario.



Signatory since 2017.

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