# Berenberg ''Journey to Green'' Construction Seminar

18 October 2022

Buzzi Unicem

# AGENDA

## KEYNOTE

## OUR JOURNEY TO NET ZERO

1. EFFICIENCY IN CONCRETE
2. CLINKER CONTENT IN CEMENT
3. ALTERNATIVE FUELS WITH BIOMASS
4. CCUS
5. DECARBONIZATION OF ELECTRICITY

# HEAVY SIDE BUILDING MATERIALS:
## AN ATTRACTIVE PLACE TO BE

### POPULATION GROWTH

9.8 billion estimated world's population by 2050, meaning about 2 billion more vs today.

### MORE URBAN DEMAND

70% of population expected to live in cities by 2050 (vs 55% today), with clear impact on residential (new homes and more renovation) and urban infrastructure.

### SUSTAINABILITY ON THE RISE

Consumer gradually more interested in sustainable products and low carbon construction. Tighter carbon regulation both in mature and emerging economies will favour circular economy models.

### INNOVATION IN BUILDING CONSTRUCTION

More efficient construction solutions, both in residential and infrastructure, will be needed in order to preserve natural resources.

# ALL CONSTRUCTION SEGMENTS ARE GOING TO CATCH THESE MEGATRENDS

**RESIDENTIAL**

Strong demand, fueled by population growth and urbanization.

**NON RESIDENTIAL**

Climate policies to support private investments.

**INFRASTRUCTURE**

Relevant infrastructure package are going to be implemented in our key markets (EU Green Deal, IIJA,..).

CEMENT AND CONCRETE DEMAND IS LIKELY TO REMAIN FAVOURABLE OVER THE NEXT DECADE.

# QUO VADIS CEMENT?

## ROLE OF CEMENT AND CONCRETE

Concrete is the most used man-made material on our planet. Cement and concrete likely to remain irreplaceable materials that will play a significant role in solving the challenges of tomorrow

## KNOW-HOW IS KEY TO TACKLE THE TRANSITION

The complexity of technology and logistics will increase during the transition. Proficiency and expertise of the management in the concrete value chain will be determinant in understanding and identifying the best solutions

## PURSUING COST LEADERSHIP

Major changes in input costs (structure, weight).

New ROI models based on cost efficiency in production and distribution

## NET ZERO CONCRETE

Globally, cement industry contributes to ca. 6% of total man-made GHG emissions annually. The concrete decarbonization is very challenging for the sector and will require disruptive technlogy, like CCUS, which today are not fully available on industrial scale

## CRITICAL SIZE CAN MATTER

Not only raw materials; availability of efficient energy and CCU/S crucial production in the long run. Critical mass of a producer in a region helpful to access and connect to new infrastructure

## RICHER COMMODITY

New energy intensive technologies and more demanding customer are changing  the value of cement and concrete.

Possibly relative value versus substitutes (stell, wood, asphalt, etc.) to remain attractive.

# BUZZI UNICEM TODAY:
## WELL POSITIONED TO CATCH FUTURE OPPORTUNITIES

Well balanced portfolio with exposure to mature markets as well as emerging
Strong market position in USA and Eurozone, enabling us to capture the local opportunities
Relevant exposure to Mexico and Brazil, countries with attractive prospects in population growth and urbanization

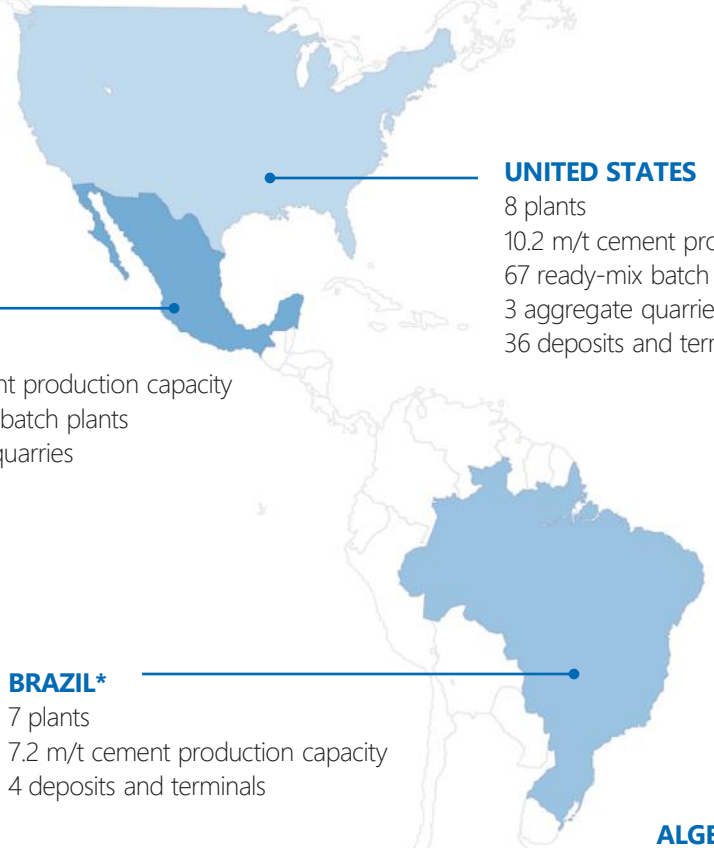
Above 40 mt of cement capacity available and 400 concrete plants (incl. JVs)

Strategy focused on long term and sustainable growth

Proven ability to deliver strong financial perfomance and free cash flows

Clear commitment to sustainability and value creation for all stakeholders

# OUR PRESENCE



**GERMANY, LUXEMBOURG AND NETHERLANDS**
9 plants
8.6 m/t cement production capacity
126 ready-mix batch plants
3 aggregate quarries
2 deposits and terminals

**POLAND**
1 plant
1.6 m/t cement production capacity
18 ready-mix batch plants
1 terminal

**UNITED STATES**
8 plants
10.2 m/t cement production capacity
67 ready-mix batch plants
3 aggregate quarries
36 deposits and terminals

**MEXICO***
3 plants
8.3 m/t cement production capacity
28 ready-mix batch plants
2 aggregate quarries

**ITALY**
13 plants
10.8 m/t cement production capacity
114 ready-mix batch plants
6 aggregate quarries
3 deposits and terminals

**CZECH REPUBLIC AND SLOVAKIA**
1 plant
1.1 m/t cement production capacity
65 ready-mix batch plants
6 aggregate quarries

**RUSSIA**
2 plants
4.3 m/t cement production capacity
1 terminal

**BRAZIL***
7 plants
7.2 m/t cement production capacity
4 deposits and terminals

**UKRAINE**
2 plants
3.0 m/t cement production capacity
5 ready-mix batch plants
2 deposits and terminals

**ALGERIA****
2 plants
2.0 m/t cement production capacity

* Joint ventures
** 35% ownership

*As at Dec 2021*



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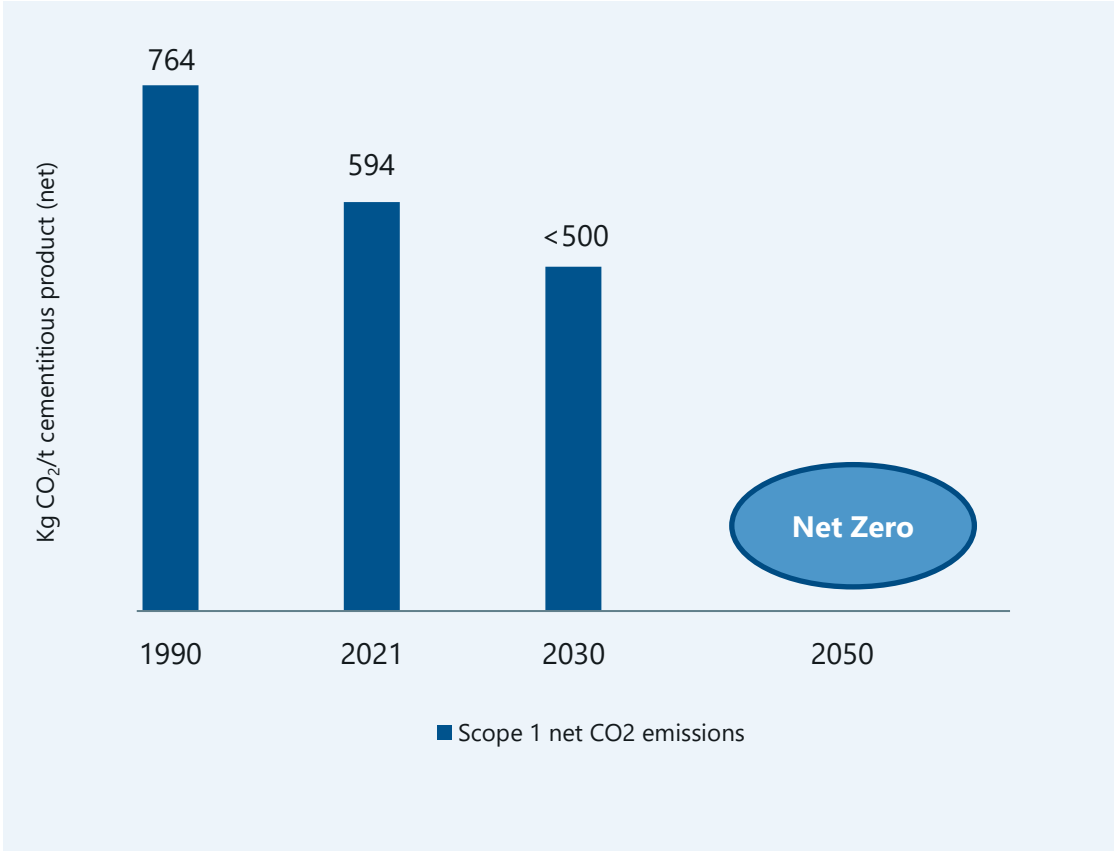
# A REALISTIC PATH TO NET ZERO

**HOW TO GET THERE**
Proven track record in $CO_2$ emissions reduction.
Already reduced by ~20% CO2 emissions in 2021 vs 1990.

**NEXT CHAPTER: NEW, SCIENCE BASED, REDUCTION TARGETS**
Targeting to achieve $CO_2$ emissions (scope 1 net) below 500 kg per ton of cementitious material by 2030, meaning another 20% reduction vs 2021 level*.

TCFD alignment
SBTi validation on-going

**ROADMAP 2030 – 2050**
Realistic path to turn ambition into reality




*scope including Brazil, excluding Russia*



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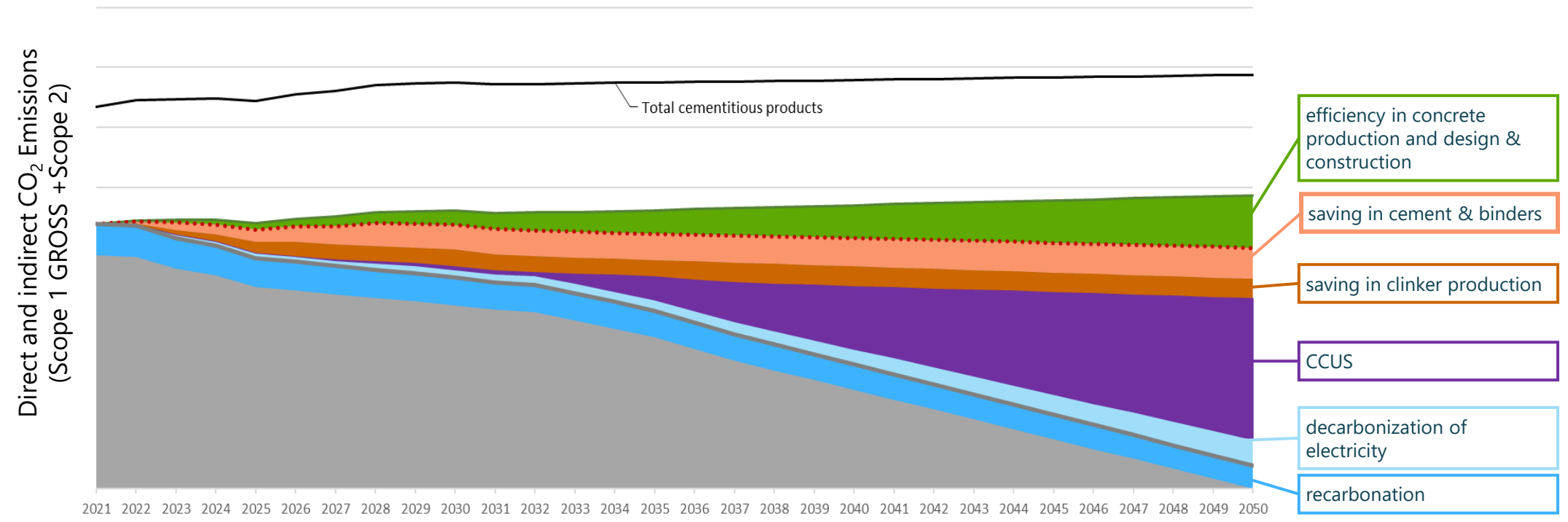
# ABSOLUTE EMISSIONS scope1 GROSS + scope2

## BREAKDOWN BY LEVERS INCLUDING ELECTRICITY DECARBONIZATION



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# CAPEX REQUIREMENTS BY 2030

Expected capex requirements for 2030 target:

750 million euros

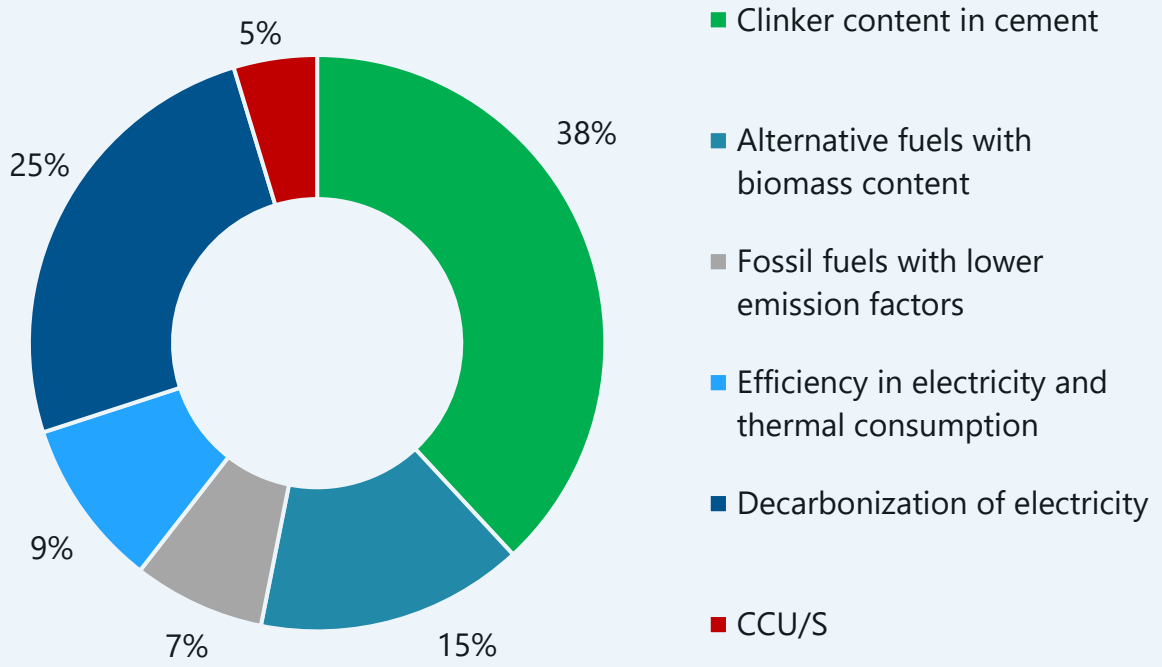
This plan leads to $CO_2$ specific capex per year equal to 20-30% of the annual avg capex spending

Maintaining ~8% of capex* to net sales ratio over the period

*excluding financial investments*

## CAPEX BREAKDOWN BY LEVERS

(scope 1+scope 2)



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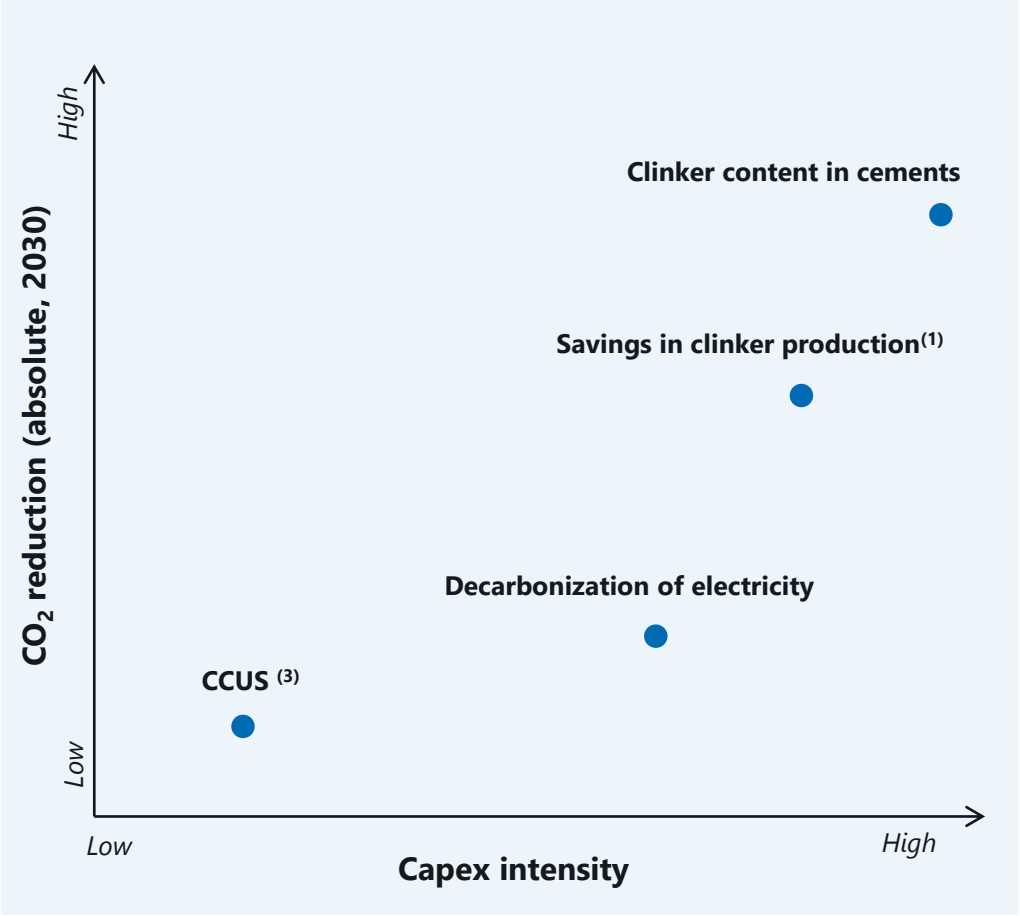
# CAPEX AND $CO_2$ REDUCTION INTENSITY




| | Payback Duration(2) |
|---|---|
| Clinker content in cements | < 5 years |
| Alternative fuels with biomass content | < 5 years |
| Fossil fuels with lower emission factors | 5-15 years |
| Efficiency in electric and thermal energy consumptions | 5-15 years |
| Decarbonization of electricity | 5-15 years |
| CCU/S (3) | < 5 years |

*(1) Including: Alternative fuels with biomass content, fossil fuels with lower emission factors and efficiency in electric and thermal energy consumption*

*(2) General assumption; not considering*

*(3) Only referring to Deuna CCUS installation*



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# 1. EFFICIENCY IN CONCRETE

# HINFRA
## EFFICIENCY IN CONCRETE THROUGH VERTICAL INTEGRATION

**HINFRA** The Large Scale Digital Concrete Extrusion Project **is an innovative startup, backed by Buzzi Unicem (60% stake)**

### THE DIGITAL INFRASTRUCTURE FACTORY

HINFRA aims to become a technological hub for major civil engineering works.
Using robots in the construction of large works, HINFRA brings digital concrete on a large scale

### 3D PRINTING TO THE NEXT STEP

From the layer to **full section**, breaking down productivity and size limits.
Disruptive technology which allows to handle concrete in a more **efficient** and dynamic way

### HIGH SOCIAL AND ENVIRONMENTAL IMPACT

While developing projects with high social utilities such as mobility and green energy infrastructures, HINFRA's technology could significantly mitigate the impact of large works on the environment and local communities.

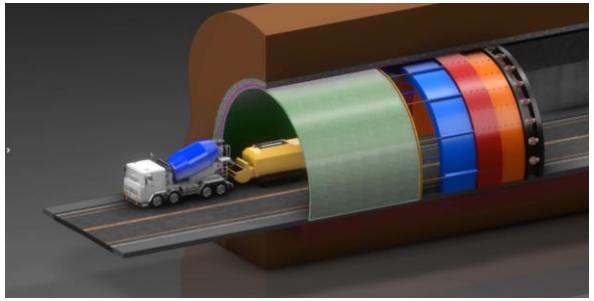
# HINFRA ETLR
## FIRST APPLICATION ON TUNNELS REGENERATION

CURRENT OPERATIONS

Scraping

New lining – cast in place

HINFRA - ETLR



- Regeneration of existing tunnels lining
- From Static to Dynamic approach
- Fully Automatized Production Train
- Patented Technology
- Boosting current Productivity rate by 10x
- Visible savings in production costs
- Recycling aggregates from demolition waste

**ETLR Roadmap**

- 2021 – R&D (materials) / Small scale extrusion tests
- H1 22 – Large scale extrusion tests
- H2 22 – Pilot in real tunnel
- 2023 – First tunnel regeneration (Italy)



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# HINFRA – NEXT STEPS

## Diversification in Italy

From highways to railways (highspeed trains/subways/…).

→ At least 2,000 km of existing tunnels (highways/railways) will need heavy rehabilitation in the next future*

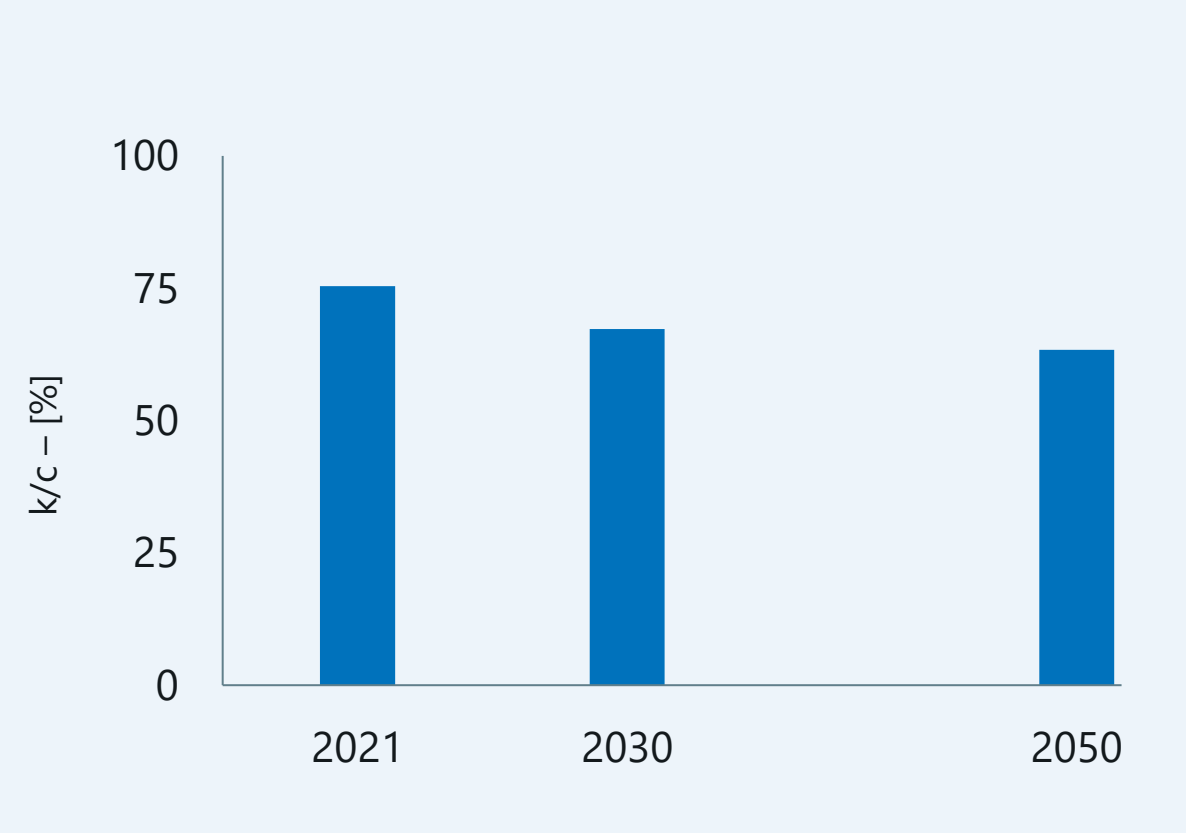
## New Tunnels

## Digital concrete in renewable energy sector

## Internationalization

# 3. CLINKER CONTENT IN CEMENT

# CLINKER CONTENT IN CEMENTS
## OUR TARGETS




**75.4%**
In 2021

**67.3%**
In 2030

**63.4%**
In 2050



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# USA: PLC Type 1L

Type 1L cements are one of the cornerstones of the carbon emissions reduction strategy we developed in the USA.

They have the same performance characteristics as standard Portland cement, they can be produced at any plant in the in the country and are distributed in both bulk and bags.

By year-end 2022 all cement plants in USA will be fully converted to Type 1L production.

**<12%**

$CO_2$ footprint in comparison to standard Type I/II cements

**8**

Cement plants in USA producing Type 1L cement


PLC
TYPE IL



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# ITALY: C-GREEN

CGreen cements will help to significantly reduce $CO_2$ emissions in concrete structures, while maintaining the equivalent technical performance as products with higher clinker content.

CEM II/C-M cements, part of CGreen line, have recently received technical evaluation certification.

Various components replace part of the clinker (50-64%): granulated blast furnace, fly ash, pozzolan and limestone.

**Up to 40%**

less $CO_2$ per ton than standard CEM I cements*

**60%**

C-Green share on product mix by 2030 (30% in 2021)


*referring to CEM II/C-M



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# GERMANY: CEDUR AND ECO COMFORT

CEM II/C cements are the crucial approach to reduce the $CO_2$ emissions in construction.

Dyckerhoff received as 1st cement producer in Germany the general technical approval for its CEM II/C cement.

**<39%**

$CO_2$ footprint in comparison to standard CEM I cements

**3**

Cement plants in Germany producing CEM II/C cements




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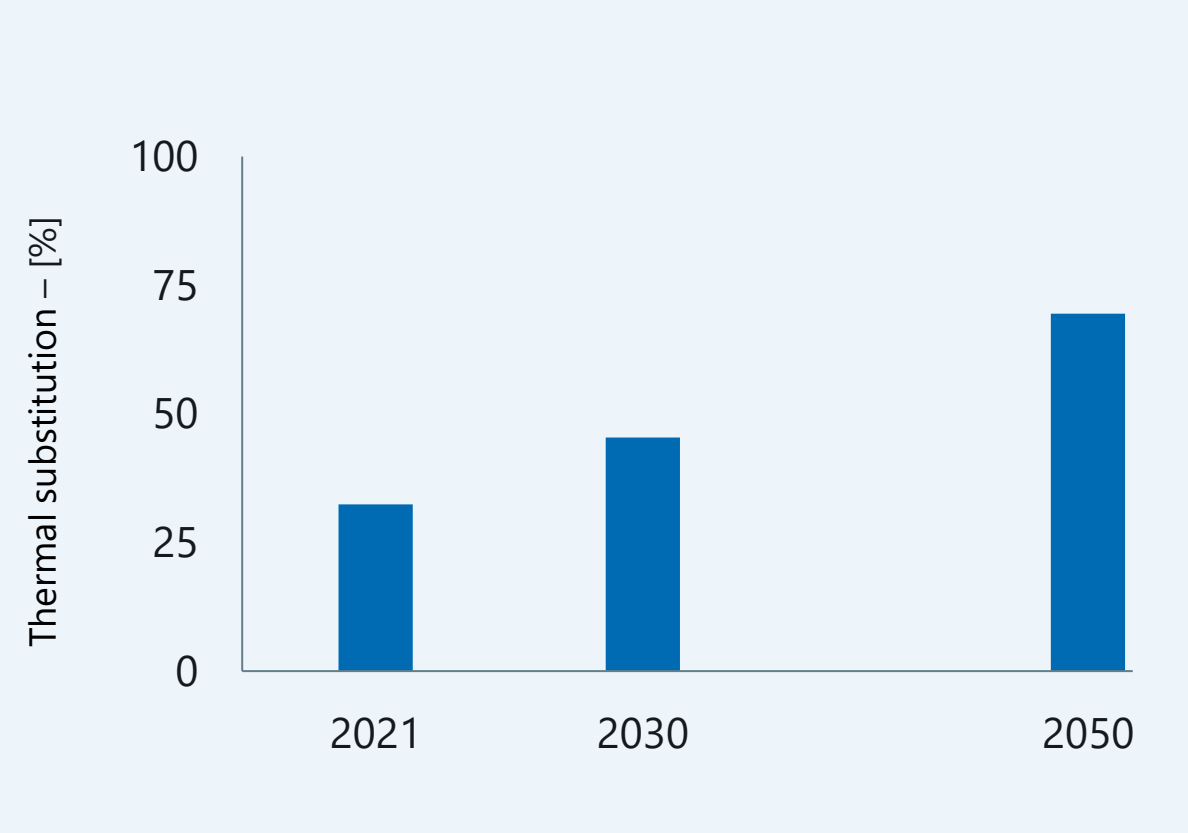
# 4. ALTERNATIVE FUELS WITH BIOMASS

# ALTERNATIVE FUELS WITH BIOMASS
## OUR TARGETS




**32.4%**

In 2021

**45.4%**

In 2030

**69.5%**

In 2050



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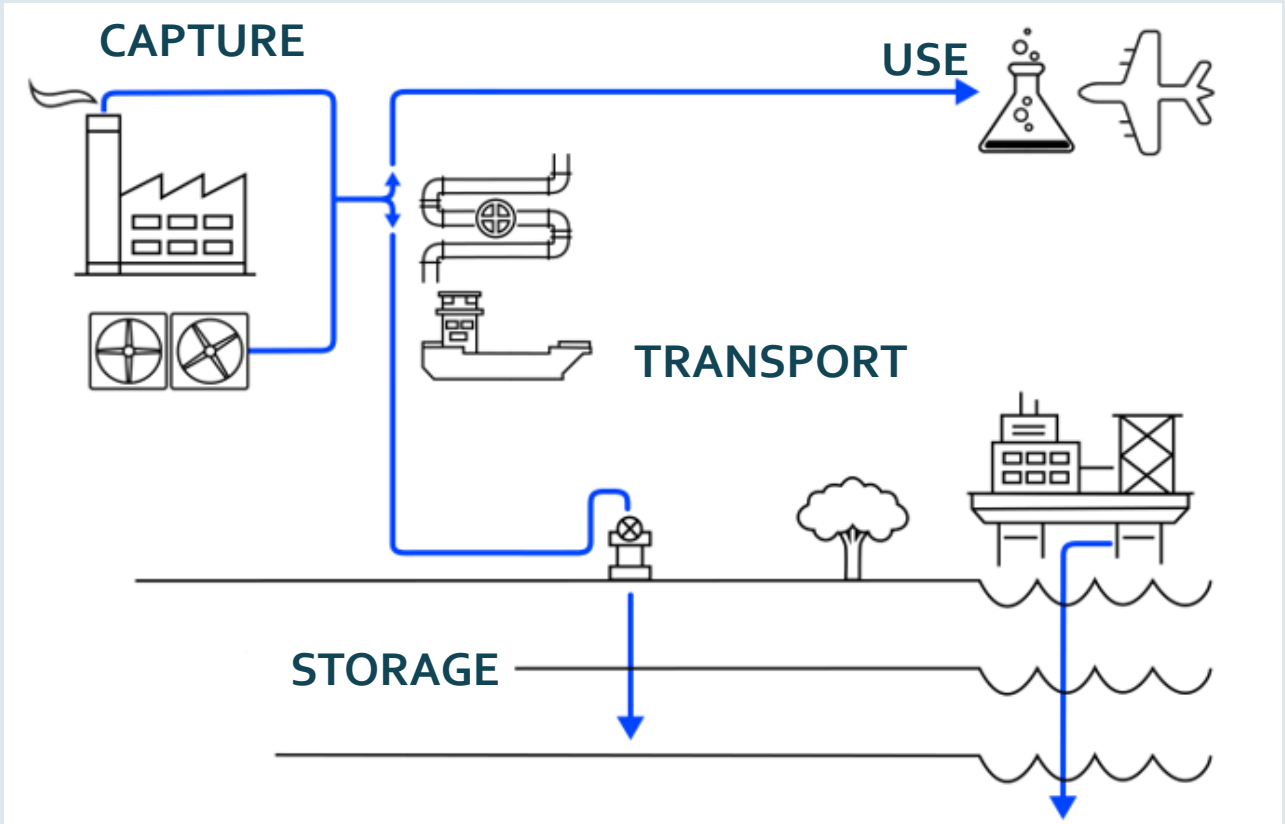
# 5. CARBON CAPTURE, USAGE AND STORAGE

# CARBON CAPTURE, (USAGE) AND STORAGE




**1%**

In 2030

**48%**

In 2050

*Additional $CO_2$ emissions due to the thermal energy requested by CCUS has not been taken into account*



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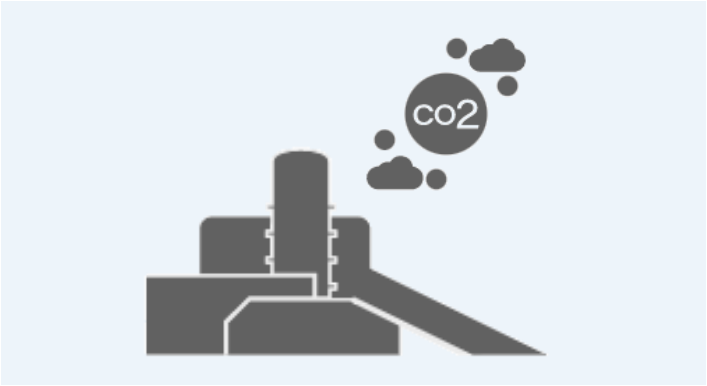
# GREEN ENERGY COOPERATION WITH TES&OGE - GERMANY

## DEUNA CEMENT PLANT (GERMANY) WILL PARTIALLY CAPTURE ITS $CO_2$ AND PARTICIPATE AT A $CO_2$ CIRCULAR ECONOMY INITIATIVE. CAPEX: 35-50 €M

### CARBON CAPTURE AT CEMENT PLANT IN DEUNA (THURINGIA)

$CO_2$ emissions will be captured and transferred into liquid $CO_2$ at Deuna cement plant. Initial start in 2027, scaled up for approx. 280,000 tons $CO_2$ capture by 2030.




### 1,000 KM $CO_2$ TRANSPORT NETWORK

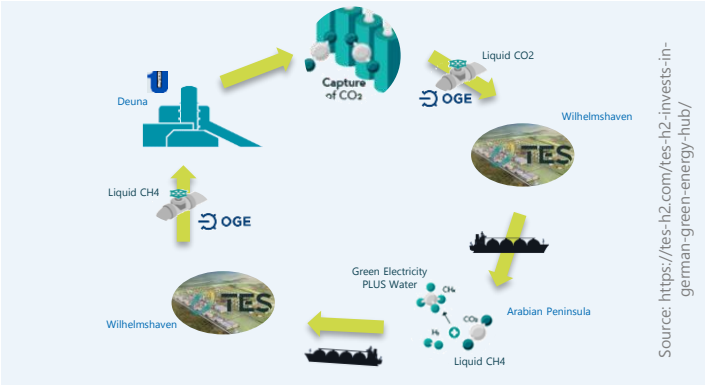
The $CO_2$ will be transported* to Wilhelmshaven. From there is will be exported by TES for a circular closed looped system or sequestration.

Source: OGE; Stefan Dinse via Shutterstock

* either by train through a JV of Rhenus & TES or by pipeline through a JV of OGE & TES.

### GREEN ENERGY HUB WILHELMSHAVEN

TES will import green methane which can be used in turn in industrial processes.




Source: https://tes-h2.com/tes-h2-invests-in-german-green-energy-hub/



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# CATCH FOR CLIMATE - GERMANY

## CI4C – CEMENT INNOVATION FOR CLIMATE WAS FOUNDEND BY BUZZI UNICEM/DYCKERHOFF, HEIDELBERGCEMENT, SCHWENK ZEMENT AND VICAT.

### DEMONSTRATION PLANT ON INDUSTRIAL SCALE IN MERGELSTETTEN

CI4C will build and operate a demonstration plant, where the oxyfuel (from oxygen and fuel) process will be applied. EPC contract with tkIS signed.

### CAPTURE OF $CO_2$ BY OXYFUEL PROCESS

Pure oxygen is introduced into the cement kiln instead of air: No other components gets into the burning process. Highly concentrated $CO_2$ is created. ~100% of $CO_2$ can be captured.

### REFUELS

The captured $CO_2$ is used to produce reFuels with the help of renewable electrical energy and turned into climate-neutral synthetic fuels such as kerosene for air traffic.





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# THE CLEANKER PROJECT - ITALY

CLEAN clinKER by calcium looping for low-$CO_2$ cement

CLEANKER


- **Advancing the integrated Calcium-Looping (CaL) process** for **$CO_2$ capture in cement plants**
- Starting date: October 1st 2017
- Duration: 4 years + 1.5 years extension (Covid-related delays)
- End date: March 31st 2023
- Capex: EUR 9m, funded by Horizon 2020
- Outcome:
  - Proved that $CO_2$ capture takes place in the Calcium Looping systems
  - Oxyfuel calcination tested and managed
- **Next Step: $CO_2$ Capture and Storage in Italy**

## Partners




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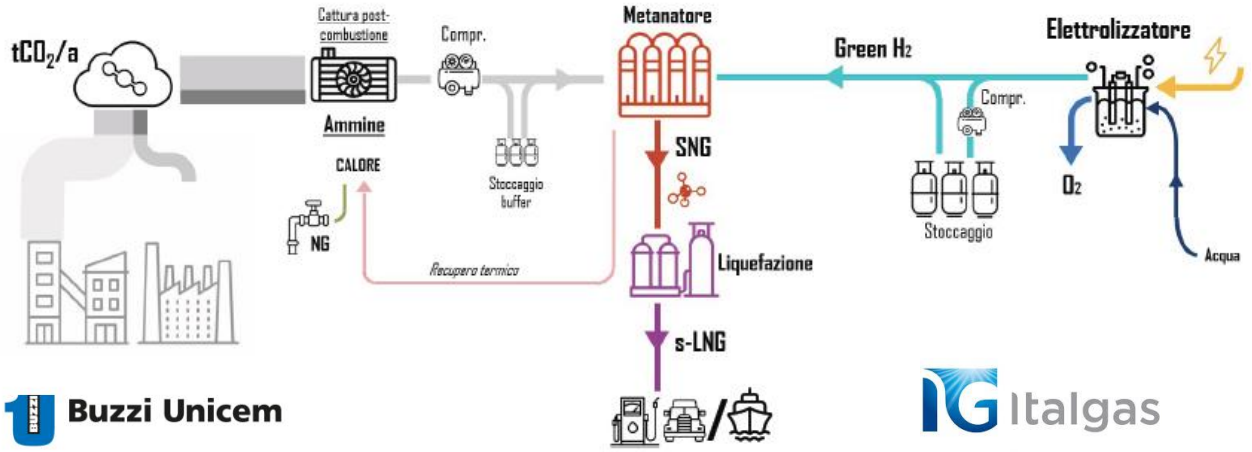
# BUZZI UNICEM – ITALGAS
## FROM CARBON CAPTURE TO GAS

Italgas leader gas distributor, first in Italy and third in Europe

- **MoU** signed in December 2021
- **Scope of work**: Feasibility study on the implementation of Power to Gas plants in combination with Carbon Capture Systems
- **Scientific advisor:** Politecnico di Torino
- **Project timeline:** Dec. 2021 – June 2022
- Main project steps:
  1. Technology definition
  2. Market analysis
  3. Business model development

**Power to Gas technology**



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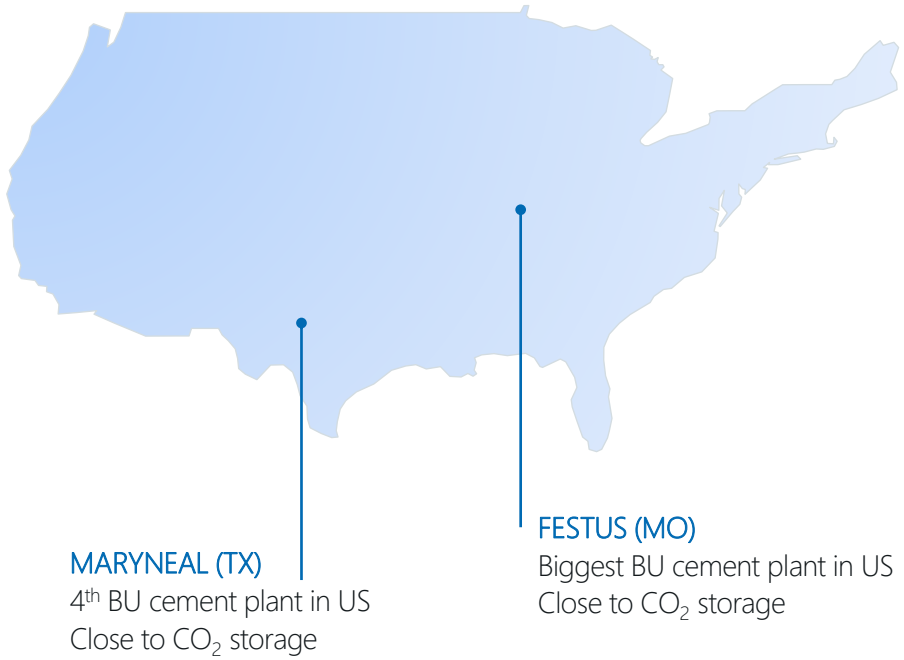
# CARBON CAPTURE PILOT TEST PROJECTS IN USA




## TECHNOLOGIES UNDER EVALUATION FOR PILOT TESTING

- Solvent scrubbing
- Membrane separation
- Solvent-Sorbent Hybrid scrubbing

## ESTIMATED PROJECT DEVELOPMENT COSTS AND CAPTURE RATE

- Maryneal, TX: 10-15 USDm (capture rate: 15 t $CO_2$/day)
- Festus, MO: 15-30 USDm (capture rate: 42 t $CO_2$/day)

## PARTIAL FUNDING FROM US DEPARTMENT OF ENERGY

Planning to apply for partial funding from the US Department of Energy Grant Program

R&D grant could cover up to 80% of the pilot project cost



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# 4. DECARBONIZATION OF ELECTRICITY

# PHOTOVOLTAIC PROJECTS SUMMARY - ITALY

## «NATURALLY» HEDGING THE RISK

**>29**

Initiatives over 5 yrs

**~180 GWh**

RES generation

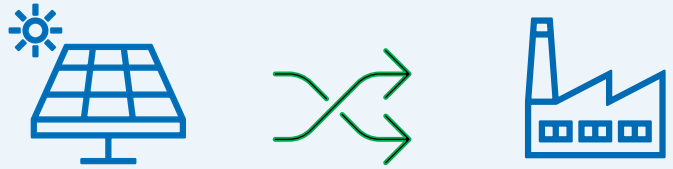
**~31%**

RES coverage

**~62 m€**

Capex

### OPTIONS TO IMPLEMENT THE RENEWABLE ELECTRICITY STRATEGY



- On site and near site generation
- Off- site PPA
- Grid incentives (auction at fixed price)
- Purchasing renewable certificates

# DISCLAIMER

THIS REPORT CONTAINS COMMITMENTS AND FORWARD-LOOKING STATEMENTS BASED ON ASSUMPTIONS AND ESTIMATES. EVEN IF THE COMPANY BELIEVES THAT THEY ARE REALISTIC AND FORMULATED WITH PRUDENTIAL CRITERIA, FACTORS EXTERNAL TO ITS WILL COULD LIMIT THEIR CONSISTENCY (OR PRECISION, OR EXTENT), CAUSING EVEN SIGNIFICANT DEVIATIONS FROM EXPECTATIONS. THE COMPANY WILL UPDATE ITS COMMITMENTS AND FORWARD-LOOKING STATEMENTS ACCORDING TO THE ACTUAL PERFORMANCE AND WILL GIVE AN ACCOUNT OF THE REASONS FOR ANY DEVIATIONS.

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