



# CARBON CAPTURE BRICKS 2026 BROCHURE

The bricks and mortar of a better future



## About us

*The 'Wonderwall' is our first pilot project, based at Sustainable Ventures in Manchester. It is a 4 x 4 metre wall cladding made with 1,200 of our N10 bricks. Each brick absorbs 178g of CO<sub>2</sub> - so this wall absorbs and permanently stores as much carbon as making 720 cups of coffee!*

As a team of scientists and engineers, we recognise the greatest threat facing humanity today is climate change. Our mission is to decarbonise the construction industry and mitigate global warming through the provision of high quality materials that capture CO<sub>2</sub> directly from the air. Our innovative products transform buildings into CO<sub>2</sub> absorption systems, helping to protect our planet, whilst also supporting the ever-growing need for new homes and infrastructure. They are life-cycle carbon-negative, fully recyclable and made from the earth, for the Earth.

We founded earth4Earth in Sheffield in 2023. Since then, the company has experienced rapid growth and we now have over 30 team members, including civil and geotechnical engineers and experts in materials science. We have a Research & Development Centre in Sheffield and a pilot factory in Wuhan, China. Now that we have established our manufacturing process, we plan to open a factory in the UK in 2026. We aim to deliver our products to clients globally and support sustainable construction worldwide.

“

The earth4Earth team were fantastic to work with — responsive, collaborative, and able to deliver at very short notice to meet our tight construction deadlines.

”

Andy Bargh, Development Manager, Sustainable Ventures

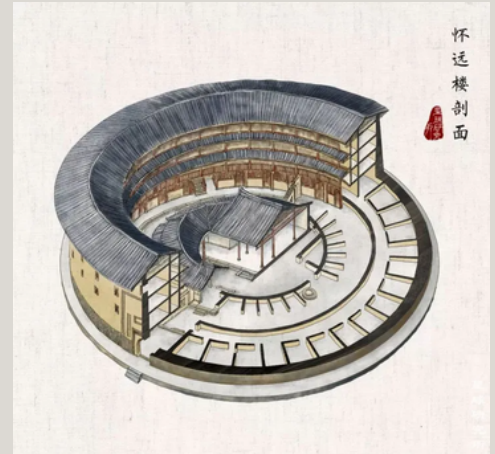


*Work in progress in Manchester*

# The inspiration

The inspiration for our company and our bricks comes from Fujian Tulou, traditional Chinese earth buildings known for their sustainable design and energy efficiency. These structures naturally regulate temperature and are resilient, even to natural disasters.

Fujian Tulou have stood for centuries. They were made using rammed earth, reinforced with bamboo and other natural materials including stone and wood. They are known for existing in harmony with nature. Our Co-founder, Professor Yi Luo, is from the Fujian Province and has studied these buildings throughout her career.



## Carbon absorption

The use of natural materials such as rammed earth during construction can contribute to carbon sequestration, helping to reduce the overall carbon footprint.

## Sustainable design

Fujian Tulou are built using locally sourced, natural materials, minimising environmental impact and promoting sustainability.

## Temperature regulation

The unique construction of these buildings allows them to maintain a stable internal temperature, staying cool in summer and warm in winter.

We have combined this legacy with our scientific research to create earth-based materials that are durable, breathable and inspired by nature.

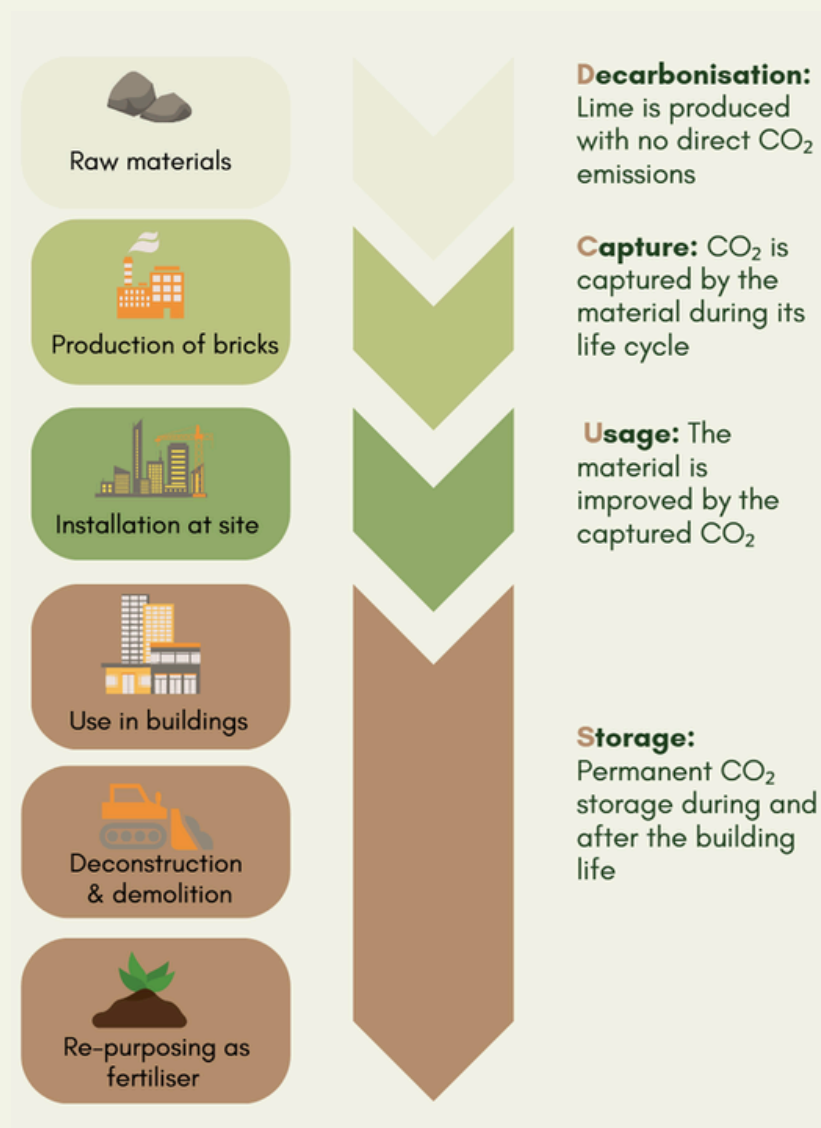


## Our technology

Lime-based binders have been used in construction for over 10,000 years. To this day, they are typically produced by heating limestone at elevated temperatures, of at least 900°C. This process generates CO<sub>2</sub> emissions from both the breakdown of the raw materials ( $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ ) and the combustion of fossil fuels to achieve the necessary high temperatures.

“ We have developed a zero-emissions lime production process that can be done at room temperature. ”

We create our lime by chemically treating naturally-decarbonised raw materials. The reaction occurs at room temperature, thus avoiding CO<sub>2</sub> emissions from both the material breakdown and combustion. This innovative production process is part of our DCUS Technology – Decarbonisation, carbon Capture, carbon Usage and carbon Storage.



# Case study: China pilot project

## A water-treatment facility built with carbon-capturing bricks

In Hubei Province, China, earth4Earth's carbon-capturing bricks were deployed in a water treatment project, showing how everyday infrastructure can deliver CO<sub>2</sub> removal at scale, without changing how buildings are designed or built.

This pilot used **200,000 earth4Earth bricks** and was assessed over a 20-year lifecycle. The result is a lifecycle net carbon removal outcome, combining low-impact manufacture with ongoing CO<sub>2</sub> uptake during service life.



### Production: a step change in embodied impact

For an equivalent quantity, traditional brick production would emit around 520,000 kg CO<sub>2</sub>. By contrast, producing the earth4Earth bricks delivered a carbon removal of -16,400 kg CO<sub>2</sub>.



### Use phase: continuous CO<sub>2</sub> capture from air

Throughout their service life, the bricks capture and permanently store atmospheric CO<sub>2</sub> through natural carbonation. Over the 20-year lifecycle, the installed bricks are projected to capture 36.5 tonnes of CO<sub>2</sub>, equivalent to purifying 18.25 million m<sup>3</sup> of air or the annual uptake of 37.4 acres of forest.

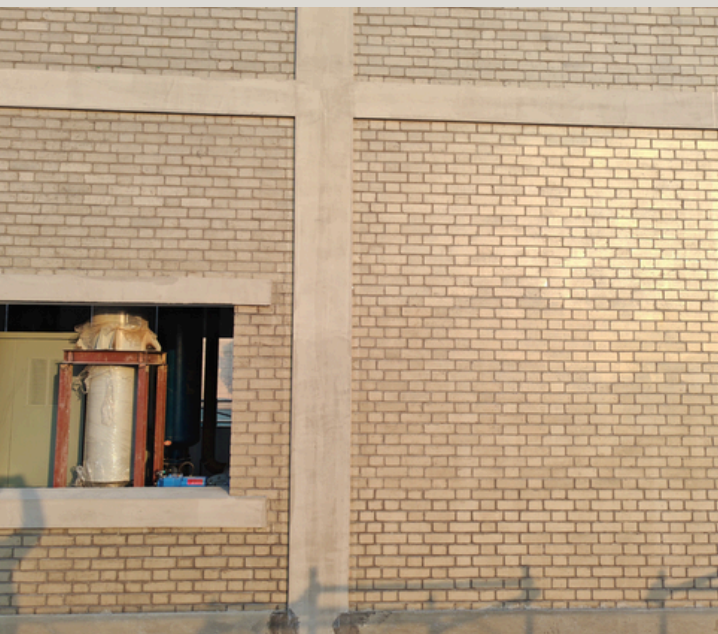


### End-of-life: circular by design

At end of life, the bricks can be crushed and recycled into agricultural soil, avoiding construction waste and supporting circular-economy outcomes aligned with "polluter pays" principles.

## Why this project matters

Construction has historically been a major source of emissions. This pilot project shows a credible pathway for the sector to shift towards being climate-positive, using masonry products that remove and store CO<sub>2</sub> while meeting real-world project requirements.



# Our products

Our materials enable clients to achieve net-zero and even become carbon-negative by absorbing and storing carbon dioxide from the air throughout their entire lifecycle.



Our first products are a range of carbon capture bricks. We have developed five types, to suit different requirements and budgets. The properties of our bricks are comparable or superior to those used traditionally and they have a range of sustainability credentials.

## Upcycled raw materials

Our bricks are made from excavated soil, which would otherwise go to landfill, promoting a circular economy and waste valorisation.



## Compressed, rather than fired

We avoid the carbon-intensive kiln firing process and this alone cuts more than half of the carbon emissions of traditional clay brickmaking.



## Outstanding performance

Up to 40 MPa compressive strength, water and frost-resistant, excellent durability (F2).



## 100% recyclable

At end-of-life, our bricks can be crushed and used in new bricks, or returned to the earth for crop growth.

## Better-than-zero net carbon

Zero or negative CO<sub>2</sub> emissions thanks to novel binder production and CO<sub>2</sub> Direct Air Capture.

Product Label	Carbon Type	Raw Material	Binder	Process-related CO <sub>2</sub> emissions* per brick	CO <sub>2</sub> captured per brick during service life
L0	Low Carbon	Recycled Soil	None	N/A	N/A
L10	Low Carbon		10% Commercial Lime	178 g	178 g
N10	Carbon Negative		10% e4E Binder	0 g	178 g
N20	Carbon Negative		20% e4E Binder	0 g	356 g
N30	Carbon Negative		30% e4E Binder	0 g	535 g

\*Process-related emissions refer only to emissions from the decomposition of the raw material during binder production. This excludes emissions from fossil fuels used for heating, and from any other life-cycle stage.

## Product Information

### e4E-N10

#### Carbon-negative brick

10% e4E binder

↓ 178g Captured CO<sub>2</sub> per brick during service life

EPD Certified Carbon Negative



## Technical Details

<b>Dimensions</b>	215 x 102.5 x 65 mm
<b>Tolerance category</b>	T2
<b>Range category</b>	R2
<b>Weight</b>	3 kg
<b>Colour</b>	Light yellow
<b>Declared compressive strength</b>	10 N/mm <sup>2</sup>
<b>Water absorption</b>	10.17%
<b>Equivalent thermal conductivity</b>	0.9 W/(m x K)
<b>Specific heat capacity</b>	0.8392 J/(g x K)
<b>Active soluble salts content</b>	S2
<b>Reaction to fire</b>	A1
<b>Dangerous substances</b>	Eco-friendly and fully recyclable, compliant with 2003/33/EC

## Additional Information

<b>Contents</b>	Soil, Sand, Carbon-Free Lime
<b>Lime (Ca(OH)<sub>2</sub>) content</b>	10%
<b>Life-cycle CO<sub>2</sub> absorbency (EPD)</b>	0.208 kg
<b>Life-cycle CO<sub>2</sub> emissions (EPD)</b>	0.195 kg
<b>Net life-cycle CO<sub>2</sub> balance (EPD)</b>	-0.013 kg



Carbon Capture Bricks

## Product Information

### e4E-N20

#### Carbon-negative brick

20% e4E binder

↓ 356g Captured CO<sub>2</sub> per brick



## Technical Details

Dimensions	215 x 102.5 x 65 mm
Tolerance category	T2
Range category	R2
Weight	3 kg
Colour	Light yellow
Declared compressive strength	7.5 N/mm <sup>2</sup>
Water absorption	13.55%
Equivalent thermal conductivity	0.8 W/(m x K)
Specific heat capacity	0.7756 J/(g x K)
Active soluble salts content	S2
Reaction to fire	A1
Dangerous substances	Eco-friendly and fully recyclable, compliant with 2003/33/EC

## Additional Information

Contents	Soil, Sand, Carbon-Free Lime
Lime (Ca(OH) <sub>2</sub> ) content	20%
Life-cycle CO <sub>2</sub> absorbency (est.)	0.3 kg
Life-cycle CO <sub>2</sub> emissions (est.)	0.1 kg
Net life-cycle CO <sub>2</sub> balance (est.)	-0.2 kg

## Product Information

### e4E-N30

#### Carbon-negative brick

30% e4E binder

↓ 535g Total Captured CO<sub>2</sub> per brick

EPD Certified Carbon Negative



## Technical Details

<b>Dimensions</b>	215 x 102.5 x 65 mm
<b>Tolerance category</b>	T2
<b>Range category</b>	R2
<b>Weight</b>	3 kg
<b>Colour</b>	Light grey
<b>Declared compressive strength</b>	7.5 N/mm <sup>2</sup>
<b>Water absorption</b>	16.86%
<b>Equivalent thermal conductivity</b>	0.8 W/(m x K)
<b>Specific heat capacity</b>	0.8584 J/(g x K)
<b>Active soluble salts content</b>	S2
<b>Reaction to fire</b>	A1
<b>Dangerous substances</b>	Eco-friendly and fully recyclable, compliant with 2003/33/EC

## Additional Information

<b>Contents</b>	Soil, Sand, Carbon-Free Lime
<b>Lime (Ca(OH)<sub>2</sub>) content</b>	30%
<b>Life-cycle CO<sub>2</sub> absorbency (EPD)</b>	0.56 kg
<b>Life-cycle CO<sub>2</sub> emissions (EPD)</b>	0.22 kg
<b>Net life-cycle CO<sub>2</sub> balance (EPD)</b>	-0.370 kg

# Product Information

## e4E-L0

### Carbon-neutral brick

100% compressed earth from upcycled waste excavation soil



## Technical Details

<b>Dimensions</b>	215 x 102.5 x 65 mm
<b>Tolerance category</b>	T2
<b>Range category</b>	R2
<b>Weight</b>	3 kg
<b>Colour</b>	Light brown
<b>Declared compressive strength</b>	3.5 N/mm <sup>2</sup>
<b>Water absorption</b>	n/a
<b>Equivalent thermal conductivity</b>	0.8 W/(m x K)
<b>Specific heat capacity</b>	0.8411 J/(g x K)
<b>Active soluble salts content</b>	S2
<b>Reaction to fire</b>	A1
<b>Dangerous substances</b>	Eco-friendly and fully recyclable, compliant with 2003/33/EC

## Additional Information

<b>Contents</b>	Soil
<b>Lime (Ca(OH)<sub>2</sub>) content</b>	0%
<b>Life-cycle CO<sub>2</sub> absorbency (est.)</b>	0 kg
<b>Life-cycle CO<sub>2</sub> emissions (est.)</b>	0 kg

## Product Information

### e4E-L10

#### Carbon-neutral brick

10% hydrated lime  $\text{Ca(OH)}_2$

↓ 178g Total Captured  $\text{CO}_2$  per brick



## Technical Details

Dimensions	215 x 102.5 x 65 mm
Tolerance category	T2
Range category	R2
Weight	3 kg
Colour	Light yellow
Declared compressive strength	10 N/mm <sup>2</sup>
Water absorption	14.31%
Equivalent thermal conductivity	0.9 W/(m x K)
Specific heat capacity	0.7822 J/(g x K)
Active soluble salts content	S2
Reaction to fire	A1
Dangerous substances	Eco-friendly and fully recyclable, compliant with 2003/33/EC

## Additional Information

Contents	Soil, Sand, Hydrated Lime
Lime ( $\text{Ca(OH)}_2$ ) content	10%
Life-cycle $\text{CO}_2$ absorbency (est.)	0.178 kg
Life-cycle $\text{CO}_2$ emissions (est.)	0.178 kg
Net life-cycle $\text{CO}_2$ balance (est.)	0.0 kg

## Carbon Absorbency

	L0 - No binder	L10 - Conventional binder	N10 - 10% e4E binder	N20 - 20% e4E binder	N30 - 30% e4E binder
Process-related CO <sub>2</sub> emissions* per brick	n/a	178g	0g	0g	0g
CO <sub>2</sub> absorption per brick	n/a	178g	178g	356g	535g

\*Process-related emissions refer only to emissions from the decomposition of the raw material during binder production. This excludes emissions from fossil fuels used for heating, and from any other life-cycle stage.

## Packaging Specifications

	L0 - No binder	L10 - Conventional binder	N10 - 10% e4E binder	N20 - 20% e4E binder	N30 - 30% e4E binder
Bricks per m <sup>2</sup>	343	343	343	343	343
Bricks per ft <sup>2</sup>	32	32	32	32	32
Bricks per pallet	400	400	400	400	400
Pack weight (tonnes)	1.1~1.2	1.1~1.2	1.1~1.2	1.1~1.2	1.1~1.2
Pack dimensions (m)	~1.08 x 1.08 x 0.69	~1.08 x 1.08 x 0.69	~1.08 x 1.08 x 0.69	~1.08 x 1.08 x 0.69	~1.08 x 1.08 x 0.69

## FAQs

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### What are e4E bricks made of?

They are made of excavated soil from construction projects, which would otherwise go to landfill. We treat the soil to make it optimal for use. This is combined with sand and our unique e4E binder. The production of binders traditionally releases high levels of CO<sub>2</sub>, but we have developed a novel production process which drastically reduces the related CO<sub>2</sub> emissions.

### How is the e4E binder made?

As with most traditional binders, ours is lime based. Lime is typically produced by heating limestone at temperatures of around 900C. Traditional production generates CO<sub>2</sub> emissions from both the breakdown of the raw materials and the fossil fuels needed to achieve the high temperatures required.

We have developed a unique lime production process that can be done at room temperature. All of the carbon produced during the manufacture of the e4E binder is also permanently stored in a solid form, rather than being released into the atmosphere as CO<sub>2</sub>.

### How are e4E bricks made?

Our bricks are compressed, rather than fired, saving significant CO<sub>2</sub> emissions. Our unique e4E binder is used to enhance the mechanical properties and durability of the bricks.

### How do e4E bricks capture carbon?

The binder in the bricks captures and stores atmospheric CO<sub>2</sub> quickly through a carbonation reaction. Once it is absorbed, the carbon further enhances the materials' properties.

### How are e4E bricks recycled?

At end-of-life, the bricks can be crushed and used in new bricks or added to soil for crop growth. As a result, they are 100% recyclable.

## FAQs

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### How is the carbon permanently stored?

When the bricks are recycled (by being crushed and used in new bricks or added to soil for crop growth), the carbon stays in the crushed material as it is chemically bound in the form of stable carbonates.

### What certification do the bricks have?

UKCA certification for the British Standard for clay masonry units BS EN 771-1

CE certification for clay masonry units EN771-1

Our N10 and N30 bricks (which contain 10% and 30% of our unique e4E binder) have received Environmental Product Declarations in accordance with EN 15804+A2 & ISO 14025. These are available to download on our website or directly from the [EPD Hub](#).

Certification from the British Board of Agréments (BBA) and further Environmental Product Declarations (EPDs) have been applied for and are pending.

### How do I request a sample?

Please contact us at [info@earth4Earth.co.uk](mailto:info@earth4Earth.co.uk) so we can discuss your project and the sample you require.

### Where can I buy e4E bricks?

We sell them directly. Please contact [info@earth4Earth.co.uk](mailto:info@earth4Earth.co.uk) so we can arrange your order.

### Do you ship worldwide?

Yes, we have a minimum order quantity for bricks shipped outside the UK. Please contact [info@earth4Earth.co.uk](mailto:info@earth4Earth.co.uk)

## FAQs

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### Do you make other shapes and sizes of brick?

Not at the moment but we plan to make different products available in the future, including brick slips.

### What mortar can be used with the bricks?

Any mortar specified in the British standard (i.e. BS EN 998-2) can be used. We are currently developing our own e4E mortar in accordance with British Standards.

### Where are the bricks made?

The bricks are currently made in Wuhan in China where we have opened our first factory. We identified this as the best place to develop and establish our manufacturing processes because of our connections there and the time and cost savings. Now that we have established our production line, we are able to make our bricks wherever they are being used. We have plans to begin production in the UK next year.



## Carbon Capture Bricks

### Contacts

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If you have any questions, please do not hesitate to contact us at

[info@earth4Earth.co.uk](mailto:info@earth4Earth.co.uk)

or visit our website

[www.earth4Earth.co.uk](http://www.earth4Earth.co.uk)

