PUBLIC DISCLOSURE STATEMENT

BRICKWORKS BUILDING PRODUCTS PTY LTD

PRODUCT CERTIFICATION

FY2022–23

Australian Government

Climate Active
Public Disclosure Statement

An Australian Government Initiative

NAME OF CERTIFIED ENTITY	Brickworks Building Products Pty Ltd
REPORTING PERIOD	1 July 2022 – 30 June 2023 Arrears
DECLARATION	*To the best of my knowledge, the information provided in this public disclosure statement is true and correct and meets the requirements of the Climate Active Carbon Neutral Standard.*  David Fitzharris Executive General Manager - Brickworks Australia 2nd May 2024

Australian Government
Department of Climate Change, Energy, the Environment and Water

Version: August 2023

1.CERTIFICATION SUMMARY

TOTAL EMISSIONS OFFSET	579 tCO_2-e
THE OFFSETS USED	30% ACCUs, 70% VCUs
RENEWABLE ELECTRICITY	N/A
CARBON ACCOUNT	Prepared by: Brickworks Building Products
TECHNICAL ASSESSMENT	21 December 2023 Energetics Next technical assessment due: FY2026

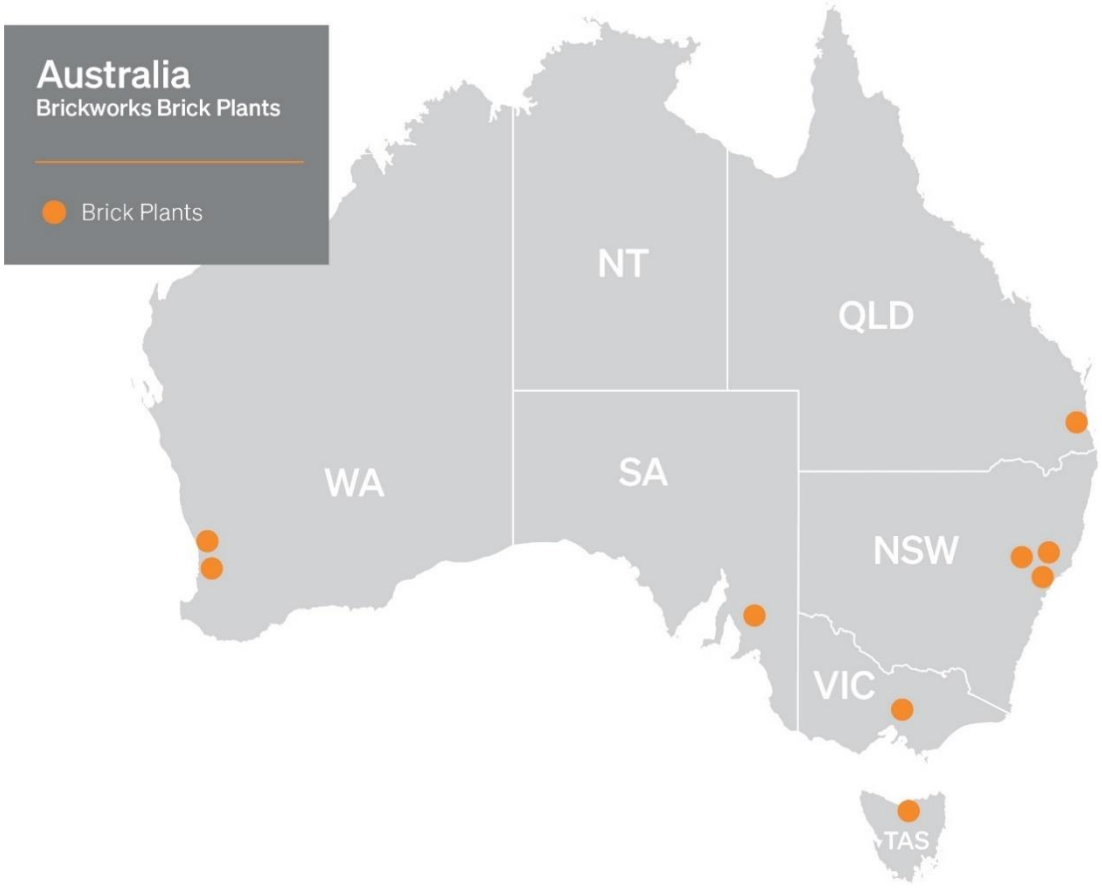
Contents

2. CARBON NEUTRAL INFORMATION

Description of certification

This Climate Active certification covers bricks and pavers manufactured at Brickworks' operations in Horsley Park 1, 2 and 3, Bowral and Punchbowl (NSW), Wollert (Vic), Golden Grove (SA), Bellevue and Cardup (WA) and Rochedale (QLD). Longford (TAS) is covered by a separate certification. Austral Bricks holds multiple ABN's in each state, and multiple brands including Daniel Robertson, Bowral Bricks and Nubrik, therefore for the purpose of Climate Active, the certification is held by Brickworks Building Products Pty Ltd but Austral Bricks and its brands will use the Climate Active certification to sell carbon neutral bricks. At these sites (see Figure 1), Brickworks produces bricks and pavers for the Australian and overseas markets.

The carbon inventory has been prepared and verified based on the Climate Active Carbon Neutral Standard for products and services, the ISO14040:2006 and ISO14044:2006 standards for life cycle assessment.



Product description

The functional unit for this certification is one thousand Single Brick Equivalents (1,000 SBE) of bricks or pavers – specified by product type – manufactured by Brickworks in Australia and used in various applications throughout Australia and overseas.

The functional unit covers the whole life cycle of the products, including cradle-to-grave manufacturing (including packaging), delivery to site, manual application, cleaning and maintenance by hand, and disposal of the bricks at end-of-life, and **is an opt-in product**.

Our bricks and pavers are kiln-fired products of different dimensions and weight. We have undertaken a life cycle assessment (LCA) that covers all our products manufactured at our eleven production sites across Australia. Initially, Brickworks intends to offer carbon neutral bricks in two ways:

- to selected clients and projects,
- all customers who purchase bricks made at Austral Bricks Longford

For this purpose, the LCA has been built into Brickworks' bespoke carbon calculator, a tool that allows us to easily calculate the total amount of greenhouse gas emissions associated with the lifecycle of any given brick type and for the exact quantity of bricks supplied to a client or building project.

The total carbon inventory to be offset will be assessed annually based on the quantity of carbon neutral certified products sold.

3.EMISSIONS BOUNDARY

Inside the emissions boundary

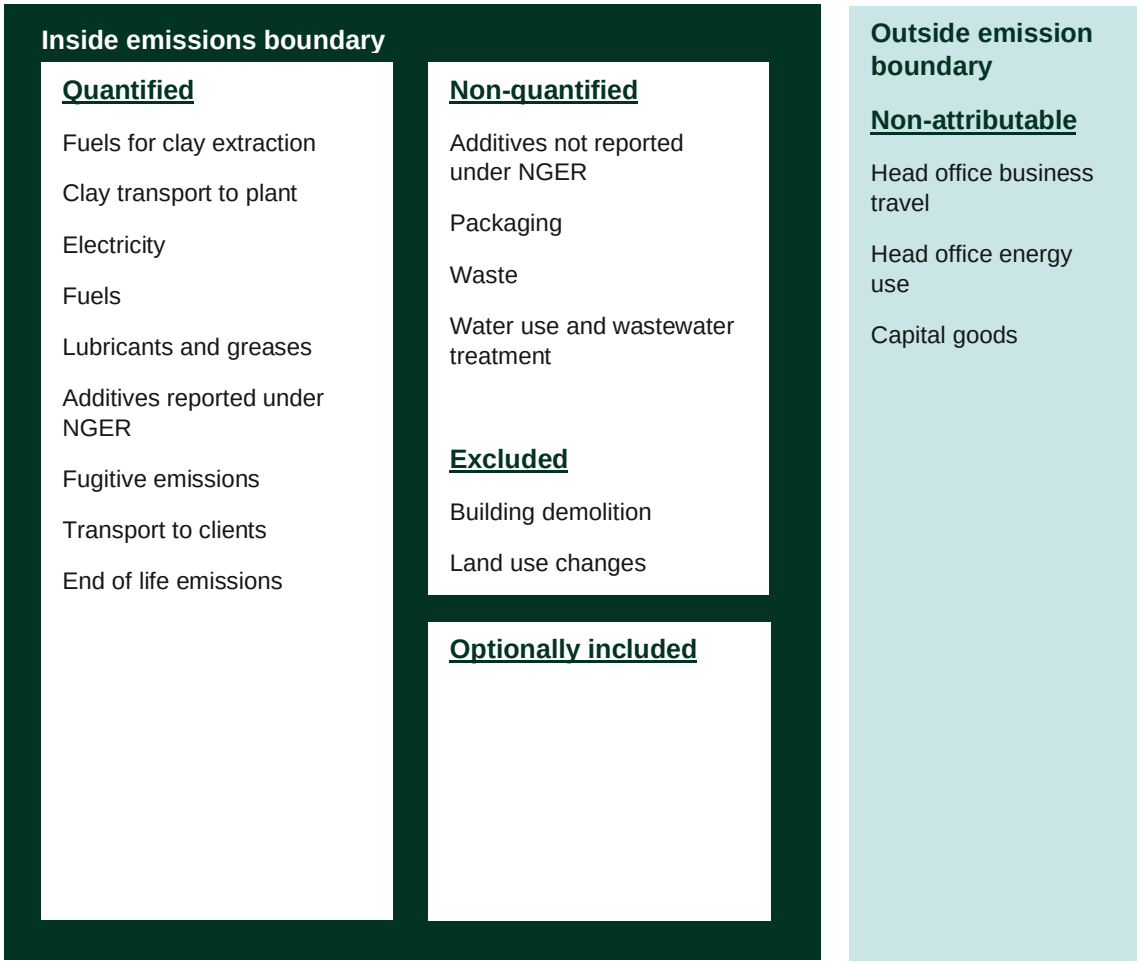
All emission sources listed in the emissions boundary are part of the carbon neutral claim.

Quantified emissions have been assessed as 'attributable processes' of a product or service. These attributable processes are services, materials and energy flows that become the product or service, make the product or service and carry the product or service through its life cycle. These attributable emissions have been quantified in the carbon inventory.

Non-quantified emissions have been assessed as attributable and are captured within the emissions boundary, but are not measured (quantified) in the carbon inventory. All material emissions are accounted for through an uplift factor. Further detail is available at Appendix C.

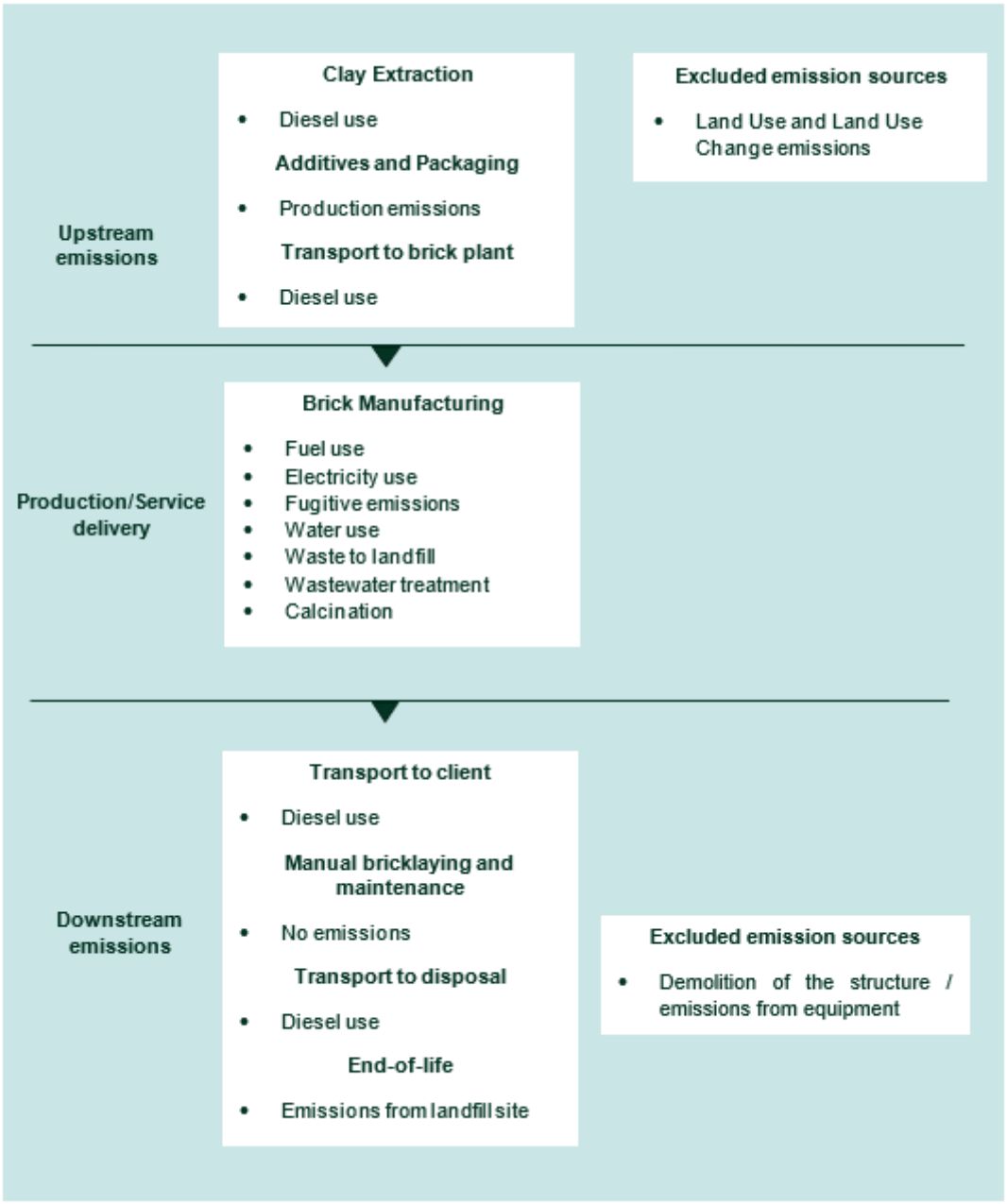
Outside the emissions boundary

Non-attributable emissions have been assessed as not attributable to a product or service. They can be **optionally included** in the emissions boundary and therefore have been offset, or they can be listed as outside of the emissions boundary (and are therefore not part of the carbon neutral claim). Further detail is available at Appendix D.



Product process diagram

The following diagram is cradle to grave.



4. EMISSIONS REDUCTIONS

Emissions reduction strategy

Brickworks is committed to social and environmental responsibility. As a large and diverse building products manufacturer, we believe we have a responsibility to our shareholders, employees, industry, environment and the wider community. Brickworks accepts responsibility for environmental protection which is integral to the conduct of its commercial operations. Brickworks' key objective is to comply with environmental laws and regulations which relate to its environmental aspects, and minimise environmental harm by operating in a manner that reaches an appropriate balance between environmental, technical, economic and social objectives. We recognise that all employees have a major role to play in protecting the environment. To achieve our environmental policy commitments, the company will actively provide for, encourage, and support training in environmental issues and sustainability.

As a subsidiary of Brickworks Limited, Austral Bricks Tasmania has the backing professional teams in environment, sustainability and research and development. Brickworks' sustainability strategy, 'Build for Living: Towards 2025', recognises the substantial environmental and social impacts of the built environment. The strategy focuses on the opportunity to make buildings and cities safe, resilient and sustainable through reducing carbon emissions. The strategies are available on Brickworks' website: https://www.brickworks.com.au/sustainability/ and https://www.brickworks.com.au/climate-related-impacts-and-responses/. During FY2023, we have completed a mid-strategy target enhancement to include carbon and product innovation targets.

New Carbon Target

Brickworks is aligning its greenhouse gas reduction strategy with the recognised standard of the Task Force on Climate-related Financial Disclosures (TCFD) recommendations, including risk management disclosures, metrics and targets. Through this process, we have developed a new carbon target: to achieve a 15% reduction in Scope 1 and 2 greenhouse gas emissions by 2030, from a 2022 baseline, across our combined Australian and North American operations.

Enhanced Carbon Transition Target

Brickworks has been delivering progress against our existing carbon transition target, to invest in the transition to the hydrogen fuel economy. Brickworks is enhancing this target, to also include the target for continued investment into developing feasible renewable biomethane opportunities.

As an industry leader using 11% bioenergy in manufacturing in Australia, we understand the critical role renewable bioenergy can have in producing low-carbon products. We are assessing the feasibility of renewable bioenergy generation at our brick plants with leading technology providers. If successful, each facility has the potential to provide a significant source of renewable energy.

Renewable bioenergy generation also offers the potential to generate carbon offsets on-site, from emission reduction activities such as the diversion of organic waste from landfill. Brickworks has 10 years

of experience in providing carbon neutral products from our Longford Tasmania facility.

Longford uses 74% bioenergy of the site's energy mix, which has avoided over 70,000 t CO2-e in emissions over 10 years. Residual 50,000 t CO2-e of emissions from the lifecycle of brick manufacture and sales from Longford have been offset over the last 10 years. We seek to replicate the success of this low brick carbon manufacturing process across Brickworks sites through the Brickworks Bioenergy Transformation strategy.

According to estimates by the Australian Renewable Energy Agency, bioenergy could account for 33% of the industrial heat processing needs by 2030. We are actively advancing various feasibility studies for a series of projects designed to significantly boost the utilisation of bioenergy. These opportunities encompass harnessing additional landfill gas resources, integrating alternative organic raw materials, and generating on-site bioenergy through anaerobic digestion.

New Product Innovation Target

Our bricks and concrete products are manufactured to provide resilience. They are durable, fire-proof, contain thermal mass for energy efficient design, excellent acoustic properties and no indoor air emissions (VOCs); and our clay bricks hold a 100-year warranty.

Brickworks will use our product strengths to develop the next generation clay brick and concrete block wall systems. Our sustainable product innovation strategy focus is to provide a wide range of thermal mass product options with high recycled content and lower embodied carbon across roofing and walling products.

By 2030, Brickworks and our partners will invest over $22.6 million into research and development into our sustainable innovation focus areas including: the thermal mass benefit of products, light-weighting, raw material optimisation to reduce embodied carbon and increase recycled content, sustainable design elements and product innovation.

Climate Related Strategy and Programs

In Australia, Brickworks Limited carbon emissions have followed a general downward trend, with a 46% decrease in FY2023 compared to the base year 2005/06 (Scope 1 and 2).

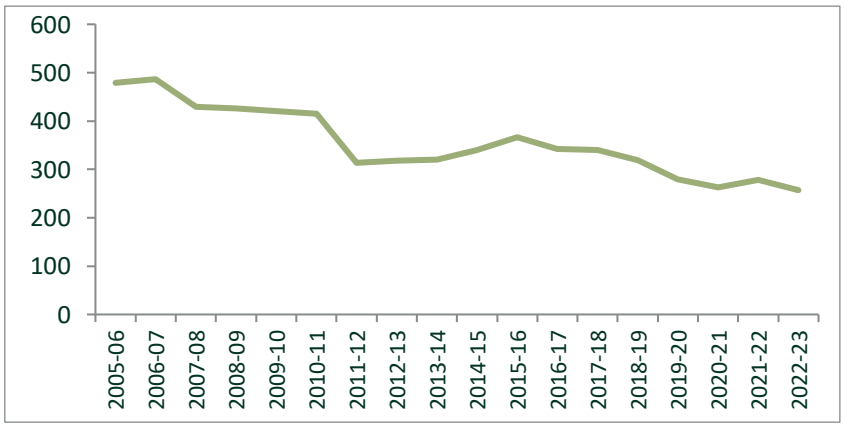


Figure 1. Brickworks Building Products Australia Greenhouse Gas Emissions Since 2005 (ktCO2-e)

The decrease is attributed to efficiencies gained from alternate fuels, manufacturing consolidation, equipment upgrades and operational improvements. Brickworks invested over $400 million dollars since 2006 in equipment upgrades and operational improvements (including new plants) and carbon reduction strategies.

Our climate-related strategy, targets and programs build on these achievements, focusing on 5 key areas, including efficiency, lower carbon energy sources, innovation, the appropriate use of offsets and improving the energy efficiency of homes over lifetime operations. Each focus area has deliverables to drive performance as referenced below.

Brickworks climate related strategic focus areas and deliverables

	Manufacturing energy efficiency strategy	**Lower Carbon Energy Sources**	**Innovation**	**Generation and purchase of offsets to provide Carbon Neutral Product options**	**Improve home energy efficiency over lifetime operations**
Strategy focus area	Achieve global leadership in leading manufacturing excellence and efficiency	Increasing use of bioenergy and low carbon fuels Renewable Electricity and Gas Purchasing Strategy	Develop the next generation clay brick and concrete block wall systems, through light-weighting, on-board fuels, raw material optimisation and product innovation	Responding to an increase in consumer preferences for products with leading sustainability attributes and low carbon options	Provide thermal mass products such as bricks and roof tiles which can reduce heating and cooling bills by up to 40% annually using cavity brick compared to lightweight construction[1].
Deliverables	10% increase in gas efficiency at Austral Bricks plants by 2030 (FY2018 baseline)	15% reduction in Scope 1 and 2 greenhouse gas emissions by 2030, from a 2022 baseline, across our combined Australian and North American operations. Continued investment into developing feasible renewable biomethane opportunities. Complete the Brickworks Hydrogen Project	Year on year increase into R&D investment into the next generation of clay brick and concrete block wall systems. This represents more than $22.6 million invested by 2030 by Brickworks and our partners. Increase the volume of verified sustainable products to 25%.	Expand range of carbon neutral offerings from the existing 12.5 million carbon neutral clay bricks sold in FY2023. Explore generation of offsets from existing land holdings. Ensure purchase of high- quality offsets (defined by Climate Active)	Invest in research for thermal design and lifecycle education (more details in the Responsible Business section).

[1] A Study of the Thermal Performance of Australian Housing, University of Newcastle, 2011-2017

Emission reductions actions

Biofuels - Brickworks has long-since used biogas and sawdust for renewable energy generation. The Alternative Fuels Program saw Brickworks Australia achieve 11% energy use composition of biofuels in FY23. In 2023 our plant at Rochedale commenced using small amounts of sawdust as onboard fuel which replaces some of the energy traditionally provided by natural gas.

Landfill gas - Austral Bricks Horsley Park, NSW, Plant 21 has used landfill gas since 2013. The combustion of landfill gas emits 10 times less carbon than natural gas. Horsley Park used 171,000 GJ of landfill gas throughout the year, preventing approximately 7,700 tonnes of carbon emissions.

Sawdust Sawdust is the main fuel source at Austral Bricks Longford, Tas and is a waste acquired from various Tasmanian sawmills. The site used 11,970 tonnes or 124,500 GJ of sawdust throughout the year. While the use of sawdust is less energy efficient than natural gas, its bioenergy component means that net carbon emissions from the combustion of sawdust is 40 times lower than natural gas avoiding 6,260 tonnes of greenhouse gas emissions.

Efficiency upgrades - Brickworks has a long history of investing in the latest kiln and manufacturing technologies which is a key approach in how Brickworks has driven a general downward trend in carbon emissions. During FY2019, the Austral Bricks Horsley Park Plant 2 kiln was shut down in preparation for an upgrade to a state-of-the-art brick manufacturing facility. Construction of the new Plant 2 facility was completed in FY2023 and commissioning is expected to be completed during the first half of FY2024.

Light-weighting to improve energy efficency – In 2023 our Queensland and NSW brick factories have continued to increased core content for some products from 27-28% to 41%, reducing material use by 18%, cutting energy consumption, and maintaining/improving product quality while increasing kiln capacity.

Vehicle and Logistics Efficiency **-** Brickworks continuously modernises its trucks after five years to provide up to date safety features for the community and public and improved fuel efficiency. In FY23, six trucks were replacement with Euro V specification. All company vehicles were fitted with telematics providing drivers and managers with real time monitoring and feedback on fuel efficiency indicators.

Exploring renewable electricity opportunities: Brickworks is undertaking a review of potential renewable electricity strategies. We have recently signed agreements to install 2,836 kW of new solar capacity on our sites including our brick factory in Wollert.

Continued innovation

Our sustainable product innovation strategy focus is to provide a wide range of thermal mass product options with high recycled content and lower embodied carbon across roofing and walling products.

During FY2023, 24 research and development projects were successfully completed and embedded into production including new products and efficiency gains. These successful projects highlight the continued potential for significant advancements across our five sustainability innovation focus areas. The relevant projects for Austral Bricks are described below.

Thermal mass - Provide leading research on passive thermal design enabling reduced lifetime energy use.

We have invested in updating critical thermal mass research demonstrating benefits from thermal mass with the University of Newcastle.

Light-weighting and higher recycled content - Brickworks' dedication to excellence means our products are fired in some of the leading energy-efficient kilns, with ongoing research to reduce brick weight through enhanced core percentage and innovative core patterns, resulting in savings on clay, energy, fuel, and ease for bricklayers. As mentioned above, our Queensland and NSW brick factories have increased core sizing for some products improving energy efficeicny. These gains are being rolled out across selected Austral Brick products.

Raw material optimisation - Optimal raw material mixes can reduce embodied carbon or process heat demands. Brickworks commitment to innovation continues to be rewarded by significant developments in energy savings and premium product development. Ongoing research into traditional clay materials has provided us with a deep understanding of their physical and chemical properties. This knowledge allows us to successfully develop raw material optimised mixes which require less process heat energy, reducing the embodied carbon of bricks. Demonstration of energy-saving raw material mixes for brick manufacturing, being rolled across Austral Brick operations.

Exploring additional biofuels opportunities **-** Brickworks is assessing the feasibility of a renewable bioenergy facility to be located next to a brick plant in Horsley Park NSW. We have partnered with Delorean Corporation to undertake a comprehensive feasibility assessment on the development of an anaerobic digestion facility that converts organic waste into renewable gas. Stage 1 of the feasibility study has shown that, if developed, the facility has the potential to produce approximately 210,000 GJ p.a. of renewable gas. If the project receives approval to proceed, the facility could reduce Brickworks scope 1 emissions by approximately 9,516 tCO2 p.a. through the displacement of natural gas. Renewable bioenergy facilities provide a pathway to begin the transition to decarbonising natural gas consumption.

5.EMISSIONS SUMMARY

Emissions over time

Brickworks has completed a comprehensive life cycle assessment for our Australian brick manufacturing facilties. This assessment includes all bricks and pavers made at the facilities and covers the emissions boundary as previously described. The table below presents the emissions overtime since the beginning of the carbon neutral certification in 2018/19.

Emissions since base year	**Life cycle emissions**				
Production location	(kg CO2-e/tonne bricks)				
	Base year: 2018-19	Year 1: 2019-20	Year 2 2020-21	Year 3 2021-22	Year 4 2022-23
Wollert (Vic)	201.1	240.2	231.4	214.2	206.0
Longford (Tas)[2]	102.4	138.5	104.7	101.1	102.6
Golden Grove (SA)	175.9	215.0	169.2	172.0	219.1
Horsley Park Plant 21	202.2	241.3	203.9	203.7	199.9
Horsley Park Plant 22	369.4	408.4	n/a	n/a	n/a[3]
Horsley Park Plant 23	195.8	234.9	161.7	179.1	185.0
Bowral Plant 28 (NSW)	319.8	358.8	299.9	279.4	294.6
Punchbowl Plant 91 (NSW)	289.7	328.7	271.3	269.6	284.6
Bellevue Plant 64 (WA)	214.5	253.6	223.5	205.4	226.3
Cardup Plant 67 (WA)	328.1	367.2	337.2	320.0	295.4
Rochedale Plant 41 (QLD)	213.0	252.1	212.0	210.6	229.6

Significant changes in emissions

Product locations with greater than (+/- 10%) change in the emission intensity are listed below in Table 4. This also provides reasons for these fluctuations in our emissions.

Emission source name	**Previous year emissions (kg CO_2-e/t)**	**Current year emissions (kg CO_2-e/t)**	**Detailed reason for change**
Golden Grove (SA)	172	219.1	Planned maintenance shut down
Bellevue Plant 64 (WA)	205.4	226.3	Site closure

[2] All products from our Longford Plant (TAS) are certified under a seperate climate active certification. Please refer to Austral Bricks (TAS) climate active PDS for further details. Life cycle emission factors disclosed may not match due to differing transport boundaries between the two PDSs.

[3] Emission factor not applicable due to incomplete year of production for Plant 22. This will be reported in FY24.

Use of Climate Active carbon neutral products and services

N/A

Emissions summary

Stage / Attributable Process / Source	tCO_2-e/tonne bricks[4]
Fuel use (diesel) at clay quarry	0.010
Fuel use (diesel) for transport of raw materials	0.002
On-site energy: Natural gas used for firing clay	0.128
On-site energy: Electricity	0.035
On-site energy: Other energy sources	0.003
Additives reported under NGER	0.001
CO_2 released (from organic carbon) during production	0.001
Uplift factor for packaging, business travel and other overhead	0.002
Uplift factor for additives not reported under NGER	0.002
Transport of bricks to customer (assuming 50km)	0.011
Manual application and manual maintenance/cleaning	0
Transport of bricks to end-of-life landfill	0.011
Bricks in landfill	0
Total inventory emissions per tonne of bricks	**0.206**

Emissions intensity per functional unit (average t CO2e/000SBE)[5]	0.888
Number of functional units to be offset	**651,000**
Total emissions to be offset (tCO2-e)	579

[4] The contribution of emission sources to the inventory will vary by site and depends on site to client transport requirements. This table shows an example of the contribution of various emission sources to the life cycle footprint of bricks produced at our largest facility in Wollert (Victoria), assuming 50 km transport to client by delivery truck.

[5] Emission intensity per functional unit is based on the actual data of products sold and transport to the project site.

6.CARBON OFFSETS

Offsets retirement approach

This certification has taken a forward purchasing offsetting approach. The total emission to offset is 579 t CO2-e. The total number of eligible offsets used in this report is 6,443. Of the total eligible offsets used, 6,443 were previously banked and no offsets were newly purchased and retired. 5,865 are remaining and have been banked for future use.

Co-benefits

Northern Savanna KACCUs (ERF104944) is an early dry season savanna burning project aimed at reducing late dry season wildfires. The project is run by the Alka Bawar (Kalpowar) Aboriginal Corporation (ABAC) and is situated above the 1,000 mm rainfall isohyet. Uncontrolled wildfires late in the dry season are common in Northern Australia, emitting large volumes of greenhouse gases. In addition, the wildfires threaten cultural sites, essential infrastructure and biodiversity.

To achieve compliance with the Methodology, the proponent undertakes strategic fire management planning and implementation, including early dry season prescribed burns (i.e. fires occurring between January 1 and July 31). This strategic burning is intended to reduce the risk of late dry season wildfires (i.e. fires occurring on or after 1 August), at which time the fuels generally have a lower moisture content, resulting in a more complete burn with higher greenhouse gas emissions. The Project is intended to generate annual revenue from the sale of ACCUs, which will support ongoing conservation management and indigenous-owned cattle operations.

The project has significant cultural and environmental co-benefits. A fire management program was instigated from 2017 and continues to the present. This mitigates wildfire risk, conserves vegetation and animal species, protects wetlands and controls weeds. Burning takes place prior to July 31st each year, before the start date of the late dry season (LDS) of the 1st of August. The operations are conducted by staff and contractors as required. •

Paroo River North Environmental Project KACCUs (ERF104646) This project establishes permanent native forests through assisted regeneration from in-situ seed sources (including rootstock and lignotubers) on land that was cleared of vegetation and where regrowth was suppressed for at least 10 years prior to the project having commenced.

Thaa-Nguigarr Carbon Project, Qld (ERF109636) is an early dry season Savanna burning project aimed at reducing late dry season wildfires, and therefore reducing carbon emissions.

Balkanu Cape York Development Corporation Pty Ltd is the project proponent in association with the land holder Poonko Aboriginal Corporation and the Prescribed Body Corporate Thaa-Nguigarr. The project is carried out on Strathgordon Station covering an area of 118,000 hectares.

The project was declared by the Clean Energy Regulator on 20 December 2016. A fire management program was instigated in 2016 and continues to the present. This mitigates wildfire risk, conserves vegetation and animal species, protects wetlands and controls weeds. Burning takes place in the Early Dry

Season each year, before the start date of the Late Dry Season of the 1st August. The operations are conducted by Traditional Owners and other staff as required.

The revenue from the sale of the carbon credits obtained enables Traditional Owners to support their landholding obligations and cultural and environmental aspirations for the property.

Usak Wind Power Plant, Turkey is a wind farm in Banaz Town of Usak Province, providing renewable electricity to the Turkish grid. The project also stimulates the economic development as wind power, being an infinite and natural resource, is ecologically more sustainable than other fossil fuel-based energy generation. From a local perspective, the project provides employment opportunities for local people. Ancillary works are undertaken by local companies providing opportunities to advance technological capacity.

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Eligible offsets retirement summary

Offsets retired for Climate Active carbon neutral certification											
Project description	**Type of offset units**	**Registry**	**Date retired**	**Serial number (and hyperlink to registry transaction record)**	**Vintage**	**Stapled quantity**	**Eligible quantity retired (tCO_2-e)**	**Eligible quantity used for previous reporting periods**	**Eligible quantity banked for future reporting periods**	**Eligible quantity used for this reporting period**	**Percentage of total (%)**
Northern Savanna Project	ACCUs	ANREU	02-Sep-21	3,801,409,481 – 3,801,409,730	2019-20		250	17	60	173	30%
Paroo River North Environmental Project	ACCUs	ANREU	02-Sep-21	3,788,417,534 – 3,788,417,617 3,786,369,101 – 3,786,369,266	2019-20		84 166	0	84 166	0	0%
Thaa-Nguigarr Carbon Project	ACCUs	ANREU	22-Dec-21	8,329,894,393 - 8,329,896,392	2019-20		2000	0	2000	0	0%
Usak Wind Power Plant	VCU	VERRA	22-Dec-21	8493-25265219-25269218-VCS-VCU-1590-VER-TR-1-1546-01012015-31122015-0	2015		4000	40	3554	406	70%
									Total offsets retired this report and used in this report	579	
									Total offsets retired this report and banked for future reports	5,864	

Type of offset units	Eligible quantity (used for this reporting period)	Percentage of total
Australian Carbon Credit Units (ACCUs)	173	30%
Verified Carbon Units (VCUs)	406	70%

7. RENEWABLE ENERGY CERTIFICATE (REC) SUMMARY

Renewable Energy Certificate (REC) Summary

N/A

APPENDIX A: ADDITIONAL INFORMATION

Product Description

Brickworks Building Products Pty Ltd (Brickworks) is one of Australia's largest, best known and most diverse building material manufacturers. Our products include clay bricks and pavers, concrete masonry blocks, retaining wall systems, stone, precast concrete panels, concrete, terracotta and solar roof tiles, terracotta façades and lightweight building systems.

Brickworks has been transformed from originally a New South Wales state-based operation to a national organisation with currently eleven brick manufacturing operations in NSW, Victoria, Tasmania, South Australia, Western Australia and Queensland. Austral Bricks is the subsidiary of Brickworks that manufactures and sells Australian made clay bricks and pavers. Austral Bricks holds multiple ABN's in each state, and multiple brands including Daniel Robertson, Bowral Bricks and Nubrik, therefore for the purpose of Climate Active, the certification is held by Brickworks Building Products Pty Ltd and Austral Bricks and its brands will use the Climate Active certification to sell carbon neutral bricks.

The manufacturing process for bricks and pavers is identical and for the purpose of this document, pavers may be referred to as bricks. It starts with mining clay and shale and mechanically processing it prior to shaping and firing the bricks in kilns fuelled predominantly by natural gas.

Clay bricks are used in construction; typically walling systems, planter boxes, etc. Clay pavers are used in paving and landscaping applications.

Bricks are a building material predominately used in the construction of walls, pillars, and pavement.

Bricks hold many benefits including:

- Offer a long life
- Low maintenance
- Durable
- Healthy
- Used in energy efficient building design
- Fire resistant
- Excellent acoustic properties
- Reusable and recyclable
- Inert

Table 1 and Table 2 present examples of the products studied in this LCA.

The carbon inventory has been prepared and verified based on the Climate Active Carbon Neutral Standard for products and services, the ISO14040:2006 and ISO14044:2006 standards for life cycle assessment.

Table 1: Typical brick product configurations (Source: Austral Bricks)

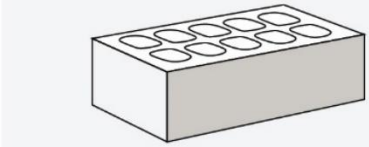
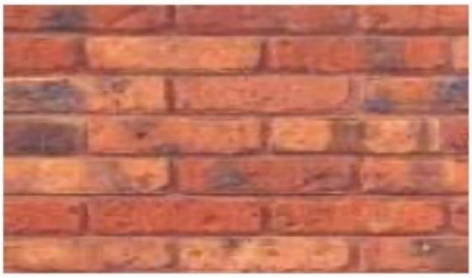
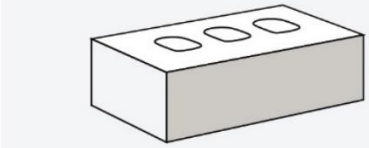
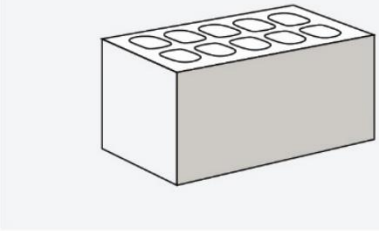
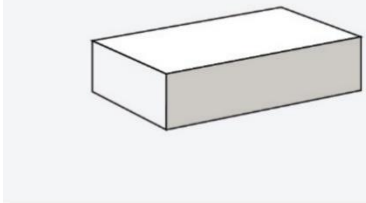
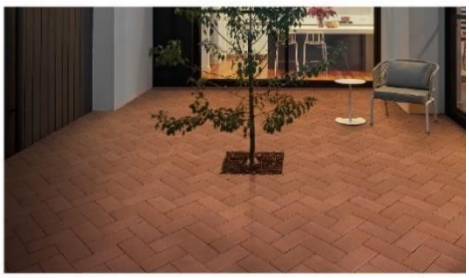
Brick shape and core hole configuration	Examples - bricks in wall application
 Standard brick with 10 core holes	
 Standard brick with 3 core holes	
 Twin brick	

Table 2: Typical paver product configuration (Source: Austral Bricks)

Paver shape	Example - pavers in paving application
 Classic paver (no core holes)	

Brickworks Climate Active certifications

Brickworks certifies selected Australian made clay brick products as carbon neutral under the Climate Active program. Brick products can become carbon neutral certified in two ways:

- All bricks made in Tasmania are carbon neutral and available to all customers. Austral Bricks Tasmania has held Carbon Neutral Certification since 2013-14;
- On a project and/or client basis for all other Australian brick factories. This option entails negotiation with our clients. i.e. for the type and quantity of bricks and pavers supplied to a project or to a client.

Brickworks holds two Climate Active Licences, one for each scenario.

The functional unit for this certification is one thousand (1,000) bricks or pavers – specified by product type – manufactured by Brickworks in Australia and used in various applications throughout Australia and overseas.

Our bricks and pavers are kiln-fired products of different dimensions and weight. We have undertaken a life cycle assessment (LCA) that covers all our products manufactured at our eleven production sites across Australia.

For this purpose, the LCA has been built into Brickworks' bespoke carbon calculator, a tool that allows us to easily calculate the total amount of greenhouse gas emissions associated with the lifecycle of any given brick type and for the exact quantity of bricks supplied to a client or building project.

The total carbon inventory to be offset will be assessed annually based on the quantity of carbon neutral certified products sold.

Emissions boundary

For each life cycle stage, all attempts have been made to identify and quantify material flows, energy flows and emission sources. The inputs include materials, fuels and energy while the outputs include products, emissions and waste.

For the purposes of this certification, the embodied energy incorporated in the infrastructure (buildings, plant, equipment, roads, vehicles, etc.) associated with manufacturing bricks and pavers is excluded from the product system. Other capital goods (e.g. power lines) are excluded as well. This is due to the long lifetime of capital goods in the brick lifecycle and the expected impact of this exclusion on the footprint is small.

Brickworks has applied a cut-off limit for flows smaller than 1% of expected greenhouse gas emissions. This means we have estimated emissions based on data from our existing LCA for bricks manufactured in Longford, instead of collecting detailed information for these smaller emission sources for each site. These are listed as non-quantified sources in Figure 2 below.

Note: Mortar and/or other materials used to bond bricks in their application are excluded from the carbon footprint assessment. The reasons for this exclusion are:

- Brickworks does not supply the mortar to clients, and therefore has no control over the composition and quantity of mortar used.
- Furthermore, the bricks and pavers are used in a range of applications that have varying requirements regarding ancillary materials. Any attempt to capture these requirements within the scope of this certification would introduce additional uncertainty

Product emissions summary notes

Brickworks has undertaken an LCA for all bricks made in Australia, allowing us to calculate the emissions intensity of each product individually (based on product characteristics and site processes) in the context of the place where it is used (transport to client).

The contribution of emission sources to the inventory will vary by site and depends on site to client transport requirements. The table published in this PDS shows an example of the contribution of various emission sources to the life cycle footprint of bricks produced at our largest facility in Wollert (Victoria), assuming 50 km transport to client by delivery truck.

When determining the emissions associated with bricks supplied to a client or project, we use the actual mass of the bricks supplied and actual transport distance from plant to client to get an accurate carbon footprint for the consignment.

The LCA has been built into Brickworks' bespoke carbon calculator, a tool that allows Brickworks to easily calculate the total amount of greenhouse gas emissions associated with the lifecycle of any given brick type and for the exact quantity of bricks supplied to a client or building project.

The total carbon inventory to be offset is assessed annually based on the quantity of carbon neutral certified products sold.

APPENDIX B: ELECTRICITY SUMMARY

N/A

APPENDIX C: INSIDE EMISSIONS BOUNDARY

Non-quantified emission sources

The following emissions sources have been assessed as attributable, are captured within the emissions boundary, but are not measured (quantified) in the carbon inventory. These emissions are accounted for through an uplift factor. They have been non-quantified due to one of the following reasons:

1. **Immaterial** <1% for individual items and no more than 5% collectively
2. **Cost effective** Quantification is not cost effective relative to the size of the emission but uplift applied.
3. **Data unavailable** Data is unavailable but uplift applied. A data management plan must be put in place to provide data within 5 years.
4. **Maintenance** Initial emissions non-quantified but repairs and replacements quantified.

Relevant non-quantified emission sources	Justification reason
Additives not reported under NGER	Data unavailable (but uplift applied & data plan in place)
Packaging	Data unavailable (but uplift applied & data plan in place)
Waste	Immaterial
Water use and wastewater treatment	Immaterial

Excluded emission sources

Attributable emissions sources can be excluded from the carbon inventory, but still considered as part of the emissions boundary if they meet **all three of the below criteria**. An uplift factor may not necessarily be applied.

1. A data gap exists because primary or secondary data cannot be collected **(no actual data).**
2. Extrapolated and proxy data cannot be determined to fill the data gap (**no projected data**).
3. An estimation determines the emissions from the process to be **immaterial**).

	No actual data	No projected data	Immaterial
Land use and land use change emission	Yes	Yes	Yes
Demolition of the structure / emissions from equipment	Yes	Yes	Yes

Data management plan for non-quantified sources

The data management plan below outlines how more rigorous quantification can be achieved for material (greater than 1%) non-quantified emission sources.

The following items meet the condition of ‘attributable’ but are below the cut-off and are considered non-quantified. We have applied uplift factors based on the previous LCA for bricks manufactured in Longford.

- Additives not reported under National Greenhouse and Energy Reporting (NGER) Act 2007: We use a large range of additives to give each brick its unique properties (colour, glaze, etc.). Additives that are energy carriers (e.g. char, sawdust, vegetable oils, starch-based additives) are reported under our NGER obligations and have been included based on actual use and emission factors. The remaining additives are mainly minerals (e.g. iron oxide, manganese oxide) or frits (glass containing colorant). Using conservative literature data applicable to additives used at Longford (Tas), based on Brickworks’ NCOS LCA FY19, the weighted average emission factor was established as 214 kg CO2e/t of additives not already reported under NGER. This equates to 1.4 kg CO2e per tonne of bricks. This factor has been applied as the uplift factor across all products.

- Packaging, waste to landfill, water use and wastewater treatment: Based on Brickworks’ NCOS LCA FY19, the total of greenhouse gas emissions associated with these sources added up to 2.2 kg CO2e per tonne of bricks. This factor has been applied as the uplift factor across all products.

Cumulatively, the uplift factors account for 2% of the products’ life cycle emissions.

APPENDIX D: OUTSIDE EMISSION BOUNDARY

Non-attributable emissions have been assessed as not attributable to a product or service (do not carry, make or become the product/service) and are therefore not part of the carbon neutral claim. To be deemed attributable, an emission must meet two of the five relevance criteria. Emissions which only meet one condition of the relevance test can be assessed as non-attributable and therefore are outside the carbon neutral claim. Non-attributable emissions are detailed below.

1. **Size** The emissions from a particular source are likely to be large relative to other attributable emissions.

2. **Influence** The responsible entity could influence emissions reduction from a particular source.

3. **Risk** The emissions from a particular source contribute to the responsible entity's greenhouse gas risk exposure.

4. **Stakeholders** The emissions from a particular source are deemed relevant by key stakeholders.

5. **Outsourcing** The emissions are from outsourced activities that were previously undertaken by the responsible entity or from outsourced activities that are typically undertaken within the boundary for comparable products or services.

Non-attributable emissions sources summary

Emission sources tested for relevance	Size	Influence	Risk	Stakeholders	Outsourcing	Justification
Head Office business travel	N	Y	N	N	N	Corporate business travel (at 738-780 Wallgrove Rd, Horsley Park NSW) have been excluded from the boundary, as these emission sources are not attributable to the products.
Head Office energy use	N	Y	N	N	N	Corporate head office energy use (at 738-780 Wallgrove Rd, Horsley Park NSW) have been excluded from the boundary, as these emission sources are not attributable to the products.
Capital goods	N	Y	N	N	N	The embodied emissions of capital goods (plant equipment, buildings, infrastructure) are considered non-attributable to the product. This is consistent with industry standard LCAs for construction products, as outlined in the Product Category Rules (PCR) of the International EPD System and has been verified by the Registered Consultant that has compiled our inventory.

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