



PUBLIC DISCLOSURE STATEMENT

**BRICKWORKS BUILDING PRODUCTS PTY
LTD**


**PRODUCT CERTIFICATION
FY2021–22**

Australian Government
Climate Active
Public Disclosure Statement



An Australian Government Initiative



NAME OF CERTIFIED ENTITY	Brickworks Building Products Pty Ltd
REPORTING PERIOD	1 July 2021 – 30 June 2022 True up
DECLARATION	<p><i>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.</i></p> <p></p> <p>Cathy Inglis General Manager Technical & Innovation 8th February 2023</p>



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

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Version March 2022. To be used for FY20/21/CY2021 reporting onwards.



1.CERTIFICATION SUMMARY

TOTAL EMISSIONS OFFSET	57 tCO2-e
THE OFFSETS BOUGHT	30% ACCUs, 70% VCUs
RENEWABLE ELECTRICITY	N/A
TECHNICAL ASSESSMENT	15 September 2020 Joana Almeida Edge Next technical assessment due: October 2023

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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.

“Climate Active certified products are an important step in Brickworks journey towards becoming Australia’s most sustainable building materials company.”



Product description

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.

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

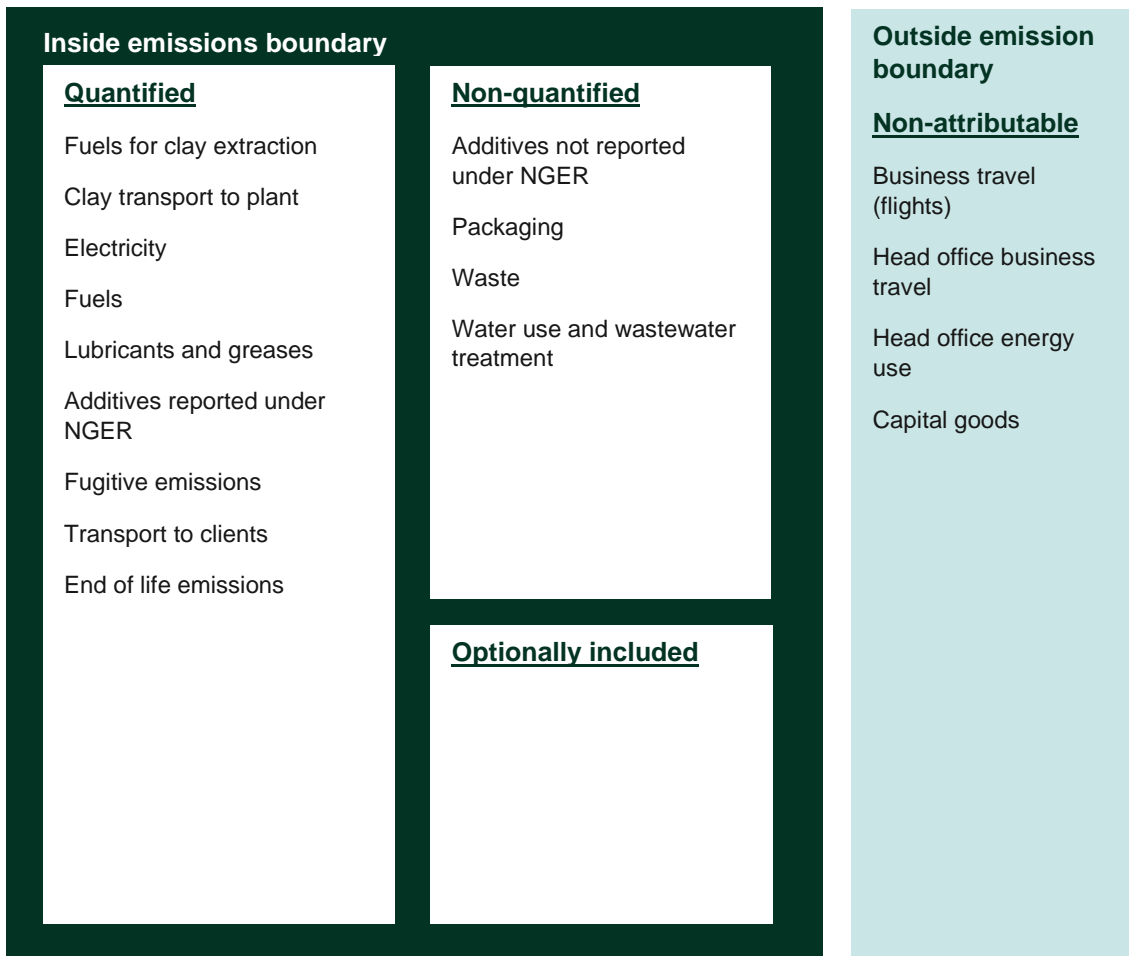
All emission sources listed in the emissions boundary are part of the carbon neutral claim.

Quantified emissions have been assessed as 'attributable processes' that become the product, make the product and carry the product through its life cycle. These 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.

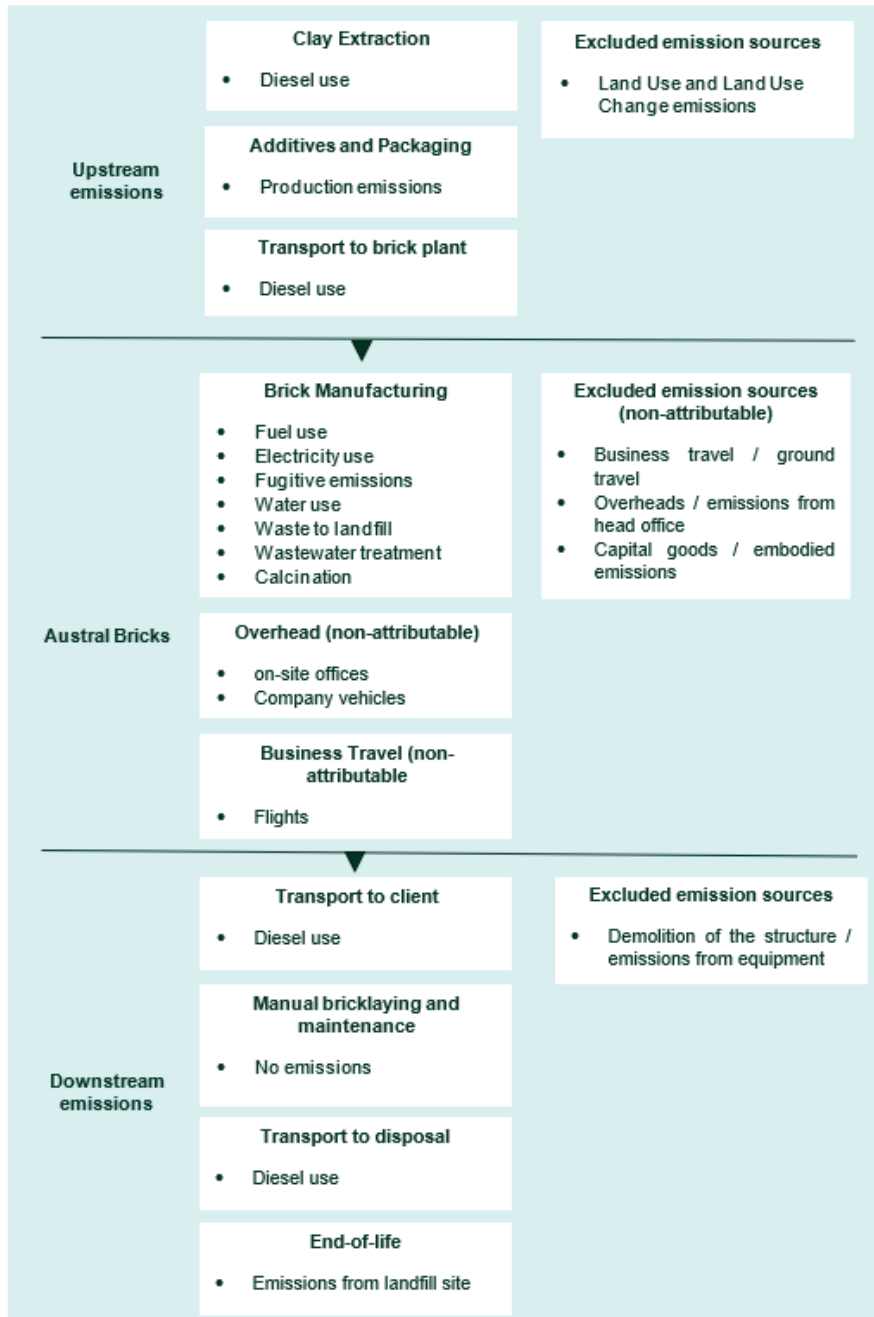
Outside the emissions boundary

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.



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.

4. EMISSIONS REDUCTIONS

Emissions reduction strategy

2025 Energy and Carbon Strategy

From its earliest days, Brickworks Building Products has been committed to continually investing in the latest manufacturing technology to contain costs and improve productivity and product quality. Today that same commitment is being applied to lowering the carbon intensity of our operations and building a sustainable future, through driving energy efficiency and exploring the use of alternative fuels in our kilns.

Energy efficiency is a key priority for Brickworks with periodic audits undertaken of all kilns. In 2018, gas efficiency plans were developed for all Australian brick kilns including Austral Bricks Longford. Those plans are continuing to be implemented. In 2020 Brickworks released its sustainability strategy which includes a Stretch target to improve our gas efficiency by 10% at our Austral Bricks plants by 2030 compared to an FY2018 baseline and investment in the transition to alternative fuels.

The management team has implemented numerous initiatives to reduce energy consumption and greenhouse gas emissions, as set out below. These initiatives will drive down energy consumption per unit of production.

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/>.

Brickworks is currently in the process of finalising updates to our policies on climate related impacts which will be included in our FY2023 PDS.

Emissions reduction actions

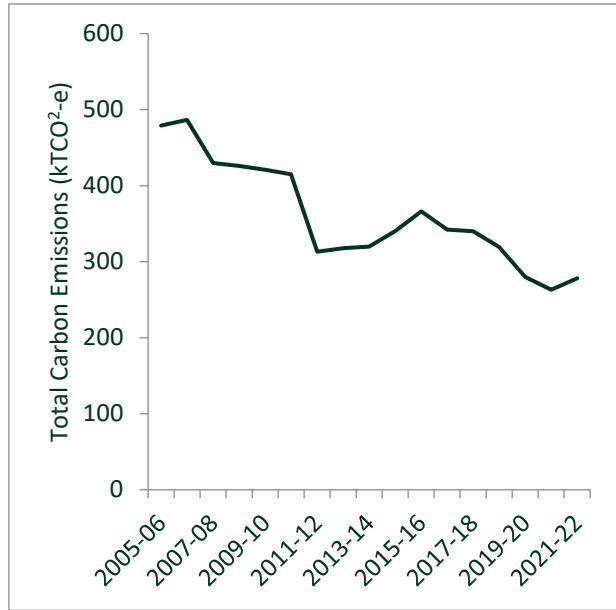
Progress to Date

Carbon emissions have followed a general downward trend, with a 42% decrease compared to the base year 2005/06 (Scope 1 and 2, Figure 4). The decrease is attributed to efficiencies gained from alternate fuels, manufacturing consolidation, equipment upgrades and operational improvements.

In FY22, our Australian operations emissions were 206,043 tonne CO₂e (Scope 1) and 72,285 tonne CO₂e (Scope 2), a 5.7% increase on the previous year due to an increase in production. (Source: Sustainability Report 21-22)

Energy efficiency is a focal point, managed using audits, regular maintenance and upgrades. Heat recovery systems are used in all Australian brick manufacturing facilities. During FY20, gas efficiency opportunities were reviewed for high gas-using sites and a centralised online gas efficiency KPI trend report was established.

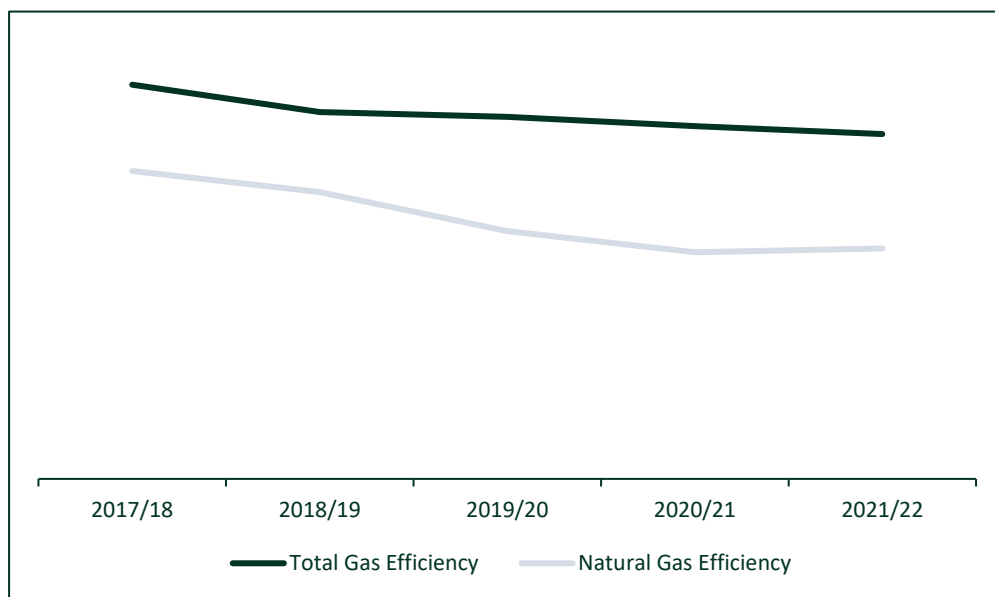
Figure 4: Brickworks Building Products Australia Carbon Emissions Since 2005 (ktCO₂-e)



During FY19, the Austral Bricks Horsley Park Plant 22 kiln was shut down in preparation for an upgrade to a state of the art brick manufacturing facility. Plant 22 is expected to commence commissioning in FY23. The graph below depicts Austral Bricks Gas efficiency trend. Total gas efficiency (including landfill gas at Horsley Park and sawdust at Longford) has improved by 4.18% since FY18. Natural gas efficiency has improved by 7.05% since FY18.

Continued investment into energy efficiency and recovery has improved many Austral Bricks kilns to exceed international leading energy efficiency benchmarks. Strategic focus areas include opportunities to upgrade remaining kilns.

Figure 5: Austral Bricks Gas Efficiency (GJ/’000 Standard Brick Equivalent)



Other actions

Biofuels - Brickworks has long-since used biogas and sawdust for renewable energy generation. The Alternative Fuels Program saw Brickworks Australia achieve 12% energy use composition of biofuels in FY22.

Landfill gas - Austral Bricks Horsley Park, NSW, Plant 21 has used landfill gas since 2013, and Plant 23 since 2014. The combustion of landfill gas emits 10 times less carbon than natural gas. Horsley Park used 220,073 GJ of landfill gas throughout the year, preventing approximately 9925 tonnes of carbon emissions.

Sawdust is the main fuel source at Austral Bricks Longford, Tas. The site used 13,521 tonnes or 140,626 GJ of sawdust throughout the year. While the use of sawdust is less energy efficient than natural gas, its renewable component means that net carbon emissions from the combustion of sawdust is 40 times lower than natural gas, preventing approximately 7,077 tonnes of carbon emissions.

Other biofuels - We continue to investigate ways to increase our biofuels content. Austral Bricks has partnered with Western Sydney University, Macquarie University and Global renewables to repurpose recovered organic materials as alternative raw materials for brick production. Pending EPA approval, composted municipal organic waste will be used as recycled content within our bricks, reducing waste sent to landfills and associated greenhouse gas emissions. The project will reduce fuel and raw materials used in brick production and produces a durable, economically viable, and environmentally friendly brick product. This project has received a grant under the NSW Circular Challenge Funding Scheme.

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 10,794 tCO₂ p.a. through the displacement of natural gas. Renewable bioenergy facilities provide a pathway to begin the transition to decarbonising natural gas consumption.

Bioenergy Innovation Challenge - As an industry leader using over 12% bioenergy in manufacturing in Australia, we understand the critical role renewable bioenergy can have in producing low-carbon products. For this reason, Brickworks has also launched the Bioenergy Innovation Challenge, to explore even more bioenergy solutions by connecting with over 100,000 innovators, 600 Universities across 120 countries

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 FY22, nine trucks were ordered for replacement with Euro V specification. In NSW and WA, drivers have received fuel efficiency training.

Reducing scope 2 emissions

Increasing renewable electricity - In Victoria, we are now progressing with surveys and preparation for 1.7MW solar power generation capacity at our major Wollert brick facility.

5. EMISSIONS SUMMARY

Emissions over time

Brickworks has completed a comprehensive life cycle assessment for our Australian brick manufacturing facilities. 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 2019/20. This year, emissions per thousand standard brick equivalents has also been included.

Emissions since base year	Life cycle emissions factor			
	(kg CO ₂ -e/tonne bricks)			kg CO ₂ -e/1000 sbe
Production location	Base year:	Year 1 2020-2021	Current year 2021-2022	Current Year 2021-2022
Wollert (Vic)	240.2	231.4	214.2	676
Longford (Tas)	138.5	104.7	101.1	303
Golden Grove (SA)	215.0	169.2	172.0	610
Horsley Park Plant 21 (NSW)	241.3	203.9	203.7	639
Horsley Park Plant 22 (NSW)	408.4	n/a	n/a	n/a
Horsley Park Plant 23 (NSW)	234.9	161.7	179.1	555
Bowral Plant 28 (NSW)	358.8	299.9	279.4	1,108
Punchbowl Plant 91 (NSW)	328.7	271.3	269.6	800
Bellevue Plant 64 (WA)	253.6	223.5	205.4	590
Cardup Plant 67 (WA)	367.2	337.2	320.0	869
Rochedale Plant 41 (QLD)	252.1	212.0	210.6	565

Significant changes in emissions

Product locations with greater than (+/- 5%) change in the emission intensity are listed below in Table 4.

This also provides reasons for these fluctuations in our emissions.

Product location	Current year (kgCO ₂ -e/t)	Previous year (kgCO ₂ -e/t)	Detailed reason for change
Wollert (Vic)	214.2	231.4	Decrease in electricity emissions due to a decrease in consumption and state based emission factors.
Horsley Park Plant 23 (NSW)	179.1	161.7	Increase in production and changes in product mix
Bowral Plant 28 (NSW)	279.4	299.9	Efficiencies gained due to increase in production with minimal change to total emissions
Bellevue Plant 64 (WA)	205.4	223.5	Efficiencies gained due to increase in production with minimal change to total emissions.
Cardup Plant 67 (WA)	320.0	337.2	Efficiencies gained due to a full year of production.

Use of Climate Active carbon neutral products and services

N/A.

Product emissions summary

Emission source category	tonnes CO ₂ -e/tonne bricks ¹
Fuel use (diesel) at clay quarry	0.011
Fuel use (diesel) for transport of raw materials	0.003
On-site energy: Natural gas used for firing clay	0.132
On-site energy: Electricity	0.039
On-site energy: Other energy sources	0.002
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
1. Total inventory emissions per tonne of bricks	0.214
a. Number of functional (forecasted opt-in sales)	6,000,000 SBEs
2. Emissions per functional unit (based on the number of functional units represented by the inventory) <i>Based on life cycle calculator for 2021/2022.</i>	0.642 tCO ₂ -e/1000 bricks (average all sites)
3. Carbon footprint <i>(Emissions per functional unit (2)* number of functional units (a or b from table 6))</i>	3,852 t CO ₂ -e

	Number of functional units	Total tonnes CO ₂ -e
a) Number of functional units sold this period and project finalised	30,602	57
b) Number of functional units to be forward offset demonstrating commitment to carbon neutrality (true-up to be conducted at the end of the reporting period)	6 million bricks	3,852

¹ 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.

6. CARBON OFFSETS

Offsets retirement approach

Brickworks intends to apply a forward purchasing strategy based on forecasted sales volumes, in-line with Brickworks 2025 target to double the volume of products sold in Australia that hold leading sustainable qualities.

At the end of each reporting period, the actual amount of certified carbon neutral products will be determined, as well as the number of offsets to be retired. We will consolidate any shortcomings with Climate Active eligible carbon credits and any surplus purchased units will be retired and banked for following reporting periods.

We will hold a diversified portfolio of eligible carbon offsets from reputable international and Australian projects, as advised by our carbon brokers. We aim to hold a minimum 30% carbon offsets that provide co-benefits towards the Australian environment.

Table 7

Offset purchasing strategy: Forward purchasing	
1. Total offsets previously forward purchased and banked for this report	6500
2. Total emissions liability to offset for this report	57
3. Net offset balance for this reporting period	0
4. Total offsets to be forward purchased to offset the next reporting period	6443
5. Total offsets required for this report	57

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. Include details about project types from which the offsets have been purchased.

Eligible offsets retirement summary

Offsets cancelled 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 (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 burning project Qld	KACCU _s	ANREU	02 Sept 2020	3,801,409,481 – 3,801,409,730	2019-20		250	0	233	17	30%
Paroo River North Environmental Project native forest regeneration Qld	KACCU _s	ANREU	02 Sept 2020	3,788,417,534 – 3,788,417,617	2019-20		84	0	84	0	0%
Paroo River North Environmental Project native forest regeneration Qld	KACCU _s	ANREU	02 Sept 2020	3,786,369,101 – 3,786,369,266	2019-20		165	0	165	0	0%
ERF Project 109636 Thaa-Nguigarr Carbon Project, Qld	KACCU _s	ANREU	22 Dec 2021	8,329,894,393 - 8,329,896,392	2021-22		2000	0	2000	0	0%
Usak Wind Power Plant, Turkey	VCUs	VERRA	22 Dec 2021	8493-25265219-25269218-VCS-VCU-1590-VER-TR-1-1546-01012015-31122015-0	2015		4000	0	3960	40	70%
Total offsets retired this report and used in this report										57	
Total offsets retired this report and banked for future reports									6,443		

Type of offset units	Quantity (used for this reporting period claim)	Percentage of total
Australian Carbon Credit Units (ACCU)	17	30%
Verified Carbon Units (VCU)	40	70%

7. RENEWABLE ENERGY CERTIFICATE (REC) SUMMARY

Renewable Energy Certificate (REC) Summary

N/A.

APPENDIX A: ADDITIONAL INFORMATION

Transaction details for offsets



04 September 2020

To whom it may concern,

Voluntary cancellation of units in ANREU

This letter is confirmation of the voluntary cancellation of units in the Australian National Registry of Emissions Units (ANREU) by ANREU account holder, Carbon Financial Services Pty Ltd (account number AU-2321).

The details of the cancellation are as follows:

Date of transaction	02 September 2020
Transaction ID	AU15979
Type of units	KACCU
Total Number of units	500
Serial number range (ERF Project ID)	3,788,417,534 – 3,788,417,617 (ERF104646) 3,786,369,101 – 3,786,369,266 (ERF104646) 3,801,409,481 – 3,801,409,730 (ERF104944)
Associated ERF Project Name(s)	Paroo River North Environmental Project (ERF104646) Northern Savanna Project (ERF104944)
Transaction comment	Brickworks Building Products Climate Active Certification 2020

Details of all voluntary cancellations in the ANREU are published on the Clean Energy Regulator's website, <http://www.cleanenergyregulator.gov.au/OSR/ANREU/Data-and-information>.

If you require additional information about the above transaction, please email registry-contact@cleanenergyregulator.gov.au

Yours sincerely,



David O'Toole
ANREU Operations and International Engagement
NGER and Safeguard Branch
Scheme Operations Division
Clean Energy Regulator
registry-contact@cleanenergyregulator.gov.au
www.cleanenergyregulator.gov.au

Transaction Details

Transaction details appear below.

Transaction Successfully Approved

Transaction ID	AU20811
Current Status	Completed (4)
Status Date	22/12/2021 15:42:11 (AEDT) 22/12/2021 04:42:11 (GMT)
Transaction Type	Cancellation (4)
Transaction Initiator	Wilson, Raymond Glen
Transaction Approver	Wilson, Raymond Glen
Comment	These units were cancelled on behalf of Brickworks Building Products to support its carbon neutral claim against the Climate Active Carbon Neutral Standard FY2022 and future emission periods.

Transferring Account

Account Number	AU-2545
Account Name	Carbon Neutral Pty Ltd
Account Holder	Carbon Neutral Pty Ltd

Acquiring Account

Account Number	AU-1068
Account Name	Australia Voluntary Cancellation Account
Account Holder	Commonwealth of Australia

Transaction Blocks

Party	Type	Transaction Type	Original CP	Current CP	ERF Project ID	NGER Facility ID	NGER Facility Name	Safeguard	Kyoto Project #	Vintage	Expiry Date	Serial Range	Quantity
AU	KACCU	Voluntary ACCU Cancellation			ERF109536					2021-22		8,329,894,393 - 8,329,896,392	2,000

Transaction Status History

Status Date	Status Code
22/12/2021 15:42:11 (AEDT) 22/12/2021 04:42:11 (GMT)	Completed (4)

Home

RETIRED UNITS

From Vintage	To Vintage	Serial Number	Quantity of Units	Unit Type	Project ID	Project Name	Project Type	Additional Issuance Certifications	Origination Program	Project Site State/Province	Project Country	Account Holder	Retirement Reason	Beneficial Owner	Retirement Reason Details	Date of Retirement
01/01/2015	31/12/2015	8493-25265219-25269218-VCS-VCU-1590-VER-TR-1-1546-01012015-31122015-0	4000	VCU	1546	Usak Wind Power Plant	Energy industries (renewable/non-renewable sources)			Usak Wind Farm	Turkey (TR)	Carbon Neutral Pty Ltd	Retirement for Person or Organization	Brickworks Building Products	These units were cancelled on behalf of Brickworks Building Products to support its carbon neutral claim against the Climate Active Carbon Neutral Standard FY2022 and future emission periods.	22/12/2021

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APPENDIX B: ELECTRICITY SUMMARY

N/A.

APPENDIX C: INSIDE EMISSIONS BOUNDARY

Non-quantified emission sources

The following sources emissions 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	(1) Immaterial	(2) Cost effective (but uplift applied)	(3) Data unavailable (but uplift applied & data plan in place)	(4) Maintenance
Additives reported under NGER	No	No	Yes	No
Packaging	No	No	Yes	No
Waste	No	No	Yes	No
Water use and wastewater treatment	No	No	Yes	No

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 Longford products' life cycle emissions.

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

The demolition of the building or structure in which bricks are used is excluded from the assessment, as explained earlier in this document. No other attributable emission sources have been excluded from the boundary.

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 the organisation's electricity, stationary energy and fuel emissions
2. **Influence** The responsible entity has the potential to influence the reduction of emissions from a particular source.
3. **Risk** The emissions from a particular source contribute to the organisation's greenhouse gas risk exposure.
4. **Stakeholders** Key stakeholders deem the emissions from a particular source are relevant.
5. **Outsourcing** The emissions are from outsourced activities previously undertaken within the organisation's boundary, or from outsourced activities typically undertaken within the boundary for comparable organisations.

Emission sources tested for relevance	(1) Size	(2) Influence	(3) Risk	(4) Stakeholders	(5) Outsourcing
Head Office business travel	No	Yes	No	No	No
Head Office energy use	No	Yes	No	No	No
Capital goods	No	Yes	No	No	No

The following items meet the condition of 'non-attributable' and are therefore left outside the system boundaries:

- Corporate business travel and 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.
- 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 (Rob Rouwette; Energetics).

APPENDIX E: LCA 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)

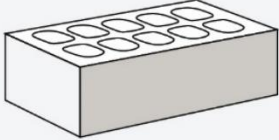

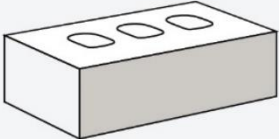

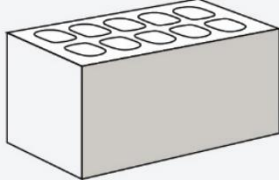

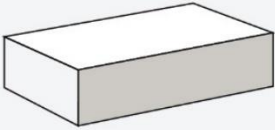

Brick shape and core hole configuration	Examples - bricks in wall application
	
	
	
Twin brick	

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/Service 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.



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