Australian Government

Carbon Neutral Program

Public Disclosure Summary

An Australian Government Initiative

THIS DOCUMENT WILL BE MADE PUBLICLY AVAILABLE

NAME OF CERTIFIED ENTITY: Austral Bricks (Tas) Pty Ltd

REPORTING PERIOD: 1/7/2018 to 30/6/2019

Declaration

To the best of my knowledge, the information provided in this Public Disclosure Summary is true and correct and meets the requirements of the National Carbon Offset Standard Carbon Neutral Program.

Signature	Date **19 December 2019**
Name of Signatory **David Johnson**	
Position of Signatory **Business Unit Manager, Austral Bricks (Tas) Pty Ltd**	

Carbon neutral certification category	Product
Date of most recent external verification/audit	19/12/2019
Auditor	Dr Paul Adams – Carbon Intelligence
Auditor assurance statement link	https://australbricks.com.au/environmental-monitoring-data/

Template Version: 6 October 2017 v5.4

Australian Government
Department of the Environment and Energy

1. Carbon neutral information

1A. Introduction

Brickworks Ltd (Brickworks) is one of the major players in the Australian brick industry.

Brickworks has been transformed from originally a New South Wales state based operation to a national organisation with manufacturing operations in NSW, Victoria, Tasmania, South Australia, Western Australia and Queensland. Austral Bricks is a subsidiary of Brickworks. Austral Bricks manufactures and markets clay products such as bricks and pavers. The manufacturing process involves mining clay and shale and mechanically processing it prior to shaping and firing the bricks in kilns fuelled predominately by natural gas.

Products are carbon neutral when net greenhouse gas emissions (emissions) are equal to zero. To become carbon neutral, organisations must calculate their emissions, reduce these emissions as much as possible, and then purchase and cancel carbon offsets or carbon credits equivalent to the remaining emissions. This process results in emissions being offset and leads to net zero emissions or being carbon neutral.

This NCOS inventory concerns bricks and pavers manufactured at Brickworks' operation in Longford, Tasmania – Austral Bricks Tasmania (see Table 1 and 2). At this site Austral Bricks Tasmania produces a range of bricks and pavers for the Tasmanian, other Australian markets and overseas markets (see Figure 2). This inventory has been prepared and verified based on the NCOS, the ISO14040:2006 and ISO14044:2006 standard and emissions are offset in accordance with the NCOS. The greenhouse gases considered in this inventory are shown in Figure 7.

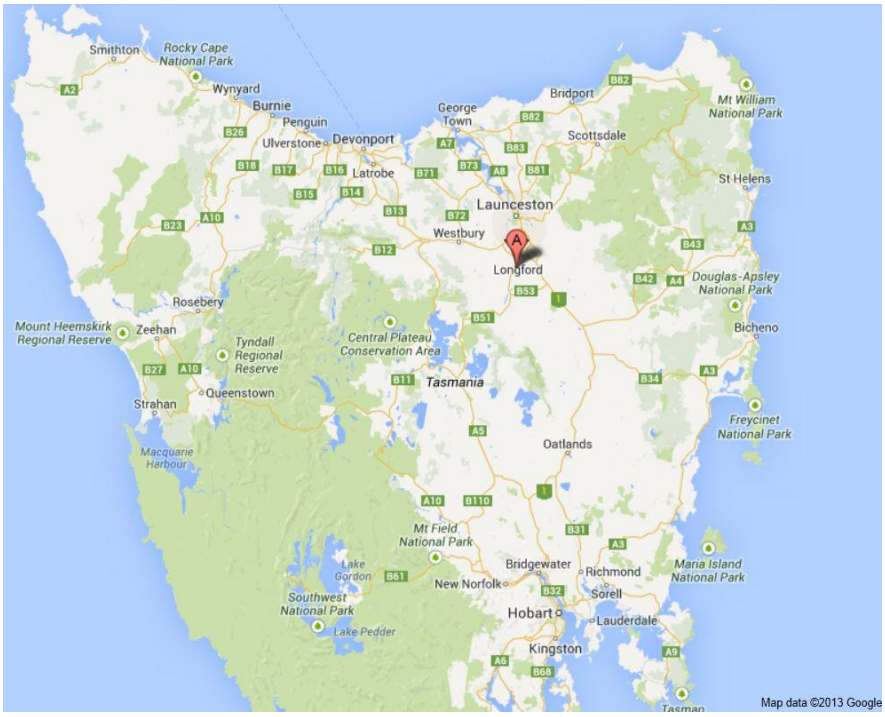


Figure 1: Plant location in Longford, Tasmania (Source: Google maps)

Figure 2: View of Longford plant storage yard (Source: Google maps)

Austral Bricks Tasmania intends to certify all the clay products manufactured at the Longford plant as carbon neutral under the NCOS program. The products made at Austral Bricks Longford include bricks and pavers:

1. **Bricks**. Clay bricks are a common building material used predominantly for wall systems in residential buildings.
2. **Pavers**. Clay pavers are used for paving and landscaping in residential, commercial and industrial applications.

Bricks are used for a number of reasons:

- load-bearing capacity - this makes bricks suitable for load-bearing walls;
- aesthetics - bricks are available in a large range of colours, tones and textures;
- durability - bricks perform their function for the duration of the service life of the building; and
- bricks require relative little maintenance and cleaning.

Pavers are similar in appearance and characteristics to bricks, although they are used for paving rather than wall applications.

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

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

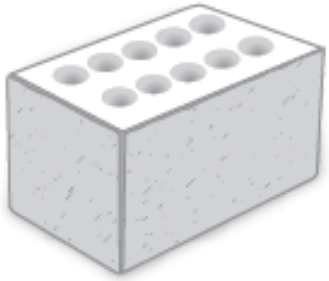
Brick shape & core hole configuration	Examples - bricks in wall application
Standard brick with 10 core holes 	
Standard brick with 3 core holes 	
Twin brick 	

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

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

The functional unit for this study is:

1,000 Single Brick Equivalents (SBEs) of bricks or pavers manufactured in Longford and used in various applications throughout Tasmania, interstate and overseas.

Single Brick Equivalent is a common unit of measurement across the clay brick industry for a brick. An SBE refers to the fired product and has the dimensions of 230x110x76mm (Think Brick Australia 2010). The products covered in this study come in a range of different sizes, which have been converted to SBEs for the purpose of this LCA.

The functional unit of SBE's has been built into the sites carbon calculator, to understand the amount of carbon associated with the lifecycle of each brick. The functional unit is not applicable to the carbon inventory as all products are offset.

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

The functional unit covers the whole life cycle of the products, including cradle-to-gate manufacturing (including packaging), delivery to site, application, cleaning and maintenance and disposal at end-of-life.

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 study would introduce additional uncertainty.

1B. Emission sources within certification boundary

The items included in this chapter cover all mandatory issues from the ISO14044:2006 standard – Goal and scope definition section (International Organization for Standardization 2006b).

Product system description

This NCOS LCA encompasses the complete life cycle of bricks and pavers:

- Raw material extraction
- Transport of raw materials to Longford
- Brick and paver manufacturing at Longford
- Packaging of fired products
- Transport to customers
- Application in works
- Use and maintenance during their life time
- Demolition and disposal at end-of-life

Other attributable processes include non-production related company facilities at Longford (i.e. offices), company vehicles and business travel of staff based in Longford.

The bricks and pavers can be applied in a range of construction works. Ancillary items that might be required for the application, such as mortar, have been excluded as these items are not supplied by Austral Bricks Tasmania.

A description of the processes in each life cycle stage is provided hereafter. This section refers mostly to bricks only. Unless specifically stated, the process is identical for pavers.

Raw materials

Natural clay minerals, including shale, make up the main body of brick. Small amounts of manganese and other additives (sawdust, coal) are blended with the clay to produce different colours. Production waste (brick batts) is ground and recycled back into the clay mixture, resulting in a situation where no production waste leaves the Longford facility.

A variety of coating materials and methods are used to produce brick of a certain colour or surface texture. To create a typical coating, sand is mechanically mixed with some type of colorant (e.g. manganese, red oxide, char, sawdust, etc.). Sometimes frit (a glass containing colorant) is added to produce surface textures.

Extraction of raw materials

Austral Bricks Tasmania sources its clay locally, from five clay pits located within Tasmania. Clay and other minerals are extracted from the earth using typical mining equipment. Some clay pits require removal of a top layer before the clay can be extracted.

Land use and Land Use Change emissions related to clay extraction have been excluded from this assessment, as these are likely negligible. Clay pits typically operate for many years, with limited annual change in land use. Furthermore, any attempt to determine the land use emissions would be impractical due to the lack of verifiable data.

Transport of raw materials to Longford

All raw materials are transported to Longford by truck. Materials sourced from outside Tasmania require additional shipping. Raw materials such as clay and shale are ‘stock piled’ in proportioned layers for a desired mixture.

The brick manufacturing process

The initial step in producing bricks is crushing, followed by grinding. The raw materials are crushed by a crusher and then go through a pan mill for grinding. Particle size is controlled by a screen installed in the grinding machinery. The raw materials are mixed homogeneously in the crushing and milling process. Next, the blend of ingredients desired for each batch is sent on to the brick shaping processes (extrusion). Once the bricks are formed, they are dried to remove excess moisture that might otherwise cause an explosion during the ensuing firing process. The bricks are fired in a tunnel kiln and then cooled. Finally, they are dehacked —automatically stacked on pallets and particleboard, wrapped with plastic bands, plastic corner protectors and potentially shrink film.

The Longford plant uses mainly sawdust to fire the kiln.

Transport of bricks to the customer

Packaged bricks are transported to Tasmanian customers using Austral Bricks Tasmania’s own fleet of trucks. These trucks have specific booms to unload the bricks safely (see Figure 3). Contractors are used to transport bricks to customers in other states (mainly Victoria), overseas and parts of North-West Tasmania.

Austral Bricks Tasmania has provided fuel consumption data for its own trucks. Literature data have been used to estimate fuel use by contractors based on transport volumes (mass) and distances. Shipping has

been included for all transport to the Australian mainland (via Port of Melbourne, Victoria) and bricks that have been exported to Yokohama (Japan), Pusan (Korea) and Auckland (New Zealand). Exported bricks are assumed to travel 100 km by truck from the port of destination to the end-use.

Figure 3: Typical delivery truck

Application of bricks and pavers in their application

Bricklaying is mostly a manual exercise. Therefore, there are no emissions associated with the application of bricks and pavers.

Note that ancillary materials, such as mortar, are not included within the system boundaries.

Use and maintenance of bricks and pavers

Bricks and pavers are inert. Therefore, there are no (greenhouse gas) emissions directly associated with the products during use.[1]

Bricks do not require regular, extensive cleaning under normal circumstances. However, there are a number of mechanisms that can lead to stains or damaged bricks. Examples[2] are:

- Mortar smears - These are the result of the bricklaying process and can be easily wiped off with water before they have hardened. Removing hardened mortar smears requires a hydrochloric acid based cleaner.
- Stains – Efflorescence (see Figure 4). Crystallised salts on the surface of bricks can mostly be removed with a dry brush.
- Stains – Insoluble white deposits (e.g. calcium). These deposits can be removed with particular acids.
- Stains – Iron oxide, manganese, vanadium stains. These stains can occur for various reasons when the mineral or oxide is present in the bricks. They can be removed with specific *acid based cleaning solutions.*

Apart from these examples walls might also be stained with organic growths, soils, timber and soots and smoke. There is not a single or typical scenario for cleaning of bricks, especially given that many of the causes for smears or stains are external.

[1] When bricks are used in the wall of a building they become part of the functional unit of that building. The operational energy used by the building depends on many factors and cannot be related to the bricks alone. Therefore, operational energy is outside the system boundary of this LCA.

[2] Source: Think Brick Australia, Industry Reference Guide, Fifth Edition 2009

It is also not practical to define a cleaning scenario related to a single brick (or 1,000 Single Brick Equivalents – SBEs) as illustrated by Figure 4: many problems are restricted to minor areas on a wall.

For these reasons, cleaning of bricks has been excluded from the carbon footprint assessment.

Figure 4: Efflorescence; the result of soluble salts that migrated to the surface
(Source: Think Brick Australia, Industry Reference Guide, Fifth Edition 2009)

The service life of bricks depends on the application. However, their durability means that under normal circumstances replacements are not required. The carbon footprint presented in this report is expressed for 1,000 SBEs and excludes any replacements.

Maintenance of bricks during their service life is not required under normal circumstances.

Therefore, we believe it justifies for exclusion from the LCA and it is in line with NCOS section 4.2.3 (f).

Demolition of bricks and pavers

Demolition is excluded from the life cycle of a brick or paver as it is assumed that demolition only takes place when the structure (e.g. house) is demolished. Given the scarcity of reliable data on demolition processes and their limited estimated impact (<5%) on the overall environmental impacts of a building, it was deemed not useful to try to allocate demolition impacts to a single brick, brick wall or paved area. This is in line with NCOS section 4.2.3 (f).

Disposal at end-of-life

In Tasmania, bricks are currently not recycled. Therefore, all bricks and pavers are assumed to go to landfill. In Victoria, 56% of masonry products is recycled[3]. This percentage is likely an overestimate for clay bricks, although this detail is not available. Bricks can be recycled into rubble for landscaping, road foundations, pathways, etc. Only a very small percentage of bricks get recycled into new bricks. The recycled products typically replace sand, crushed rocks or clay. The environmental impacts and benefits from recycling have not been taken into account in this study, as a cut-off has been applied after transport to the recycling facility.

We assume bricks are transported 50 km from the building site to the landfill site (or recycling facility) by truck.

Sawdust

Sawdust is a low-value by-product from sawmills. Detailed information on the contribution of sawdust to a mill's total income is not available. For the purpose of this LCA the sawdust has been treated as a zero-value (waste) material, which means no embodied emissions (scope 3 emissions resulting from energy use and

[3] Hyder Consulting 2012

land use change) are associated with the production of sawdust. We note that scope 3 emissions factors for biomass fuels are not available through the NGA factors workbook.

Sawdust is supplied from a number of different sawmills. We have used sawdust supply data from March 2014 to determine the weighted average transport distance (105km) between sawmills and Longford. The impact of this simplification is less than 1% on the total footprint.

1C. Diagram of the certification boundary

The system boundary (key processes and flows shown in Figure 5) describes which processes are included and excluded in the LCA. This LCA for Austral Bricks Tasmania covers the full life cycle of clay bricks and pavers manufactured in Longford, Tasmania.

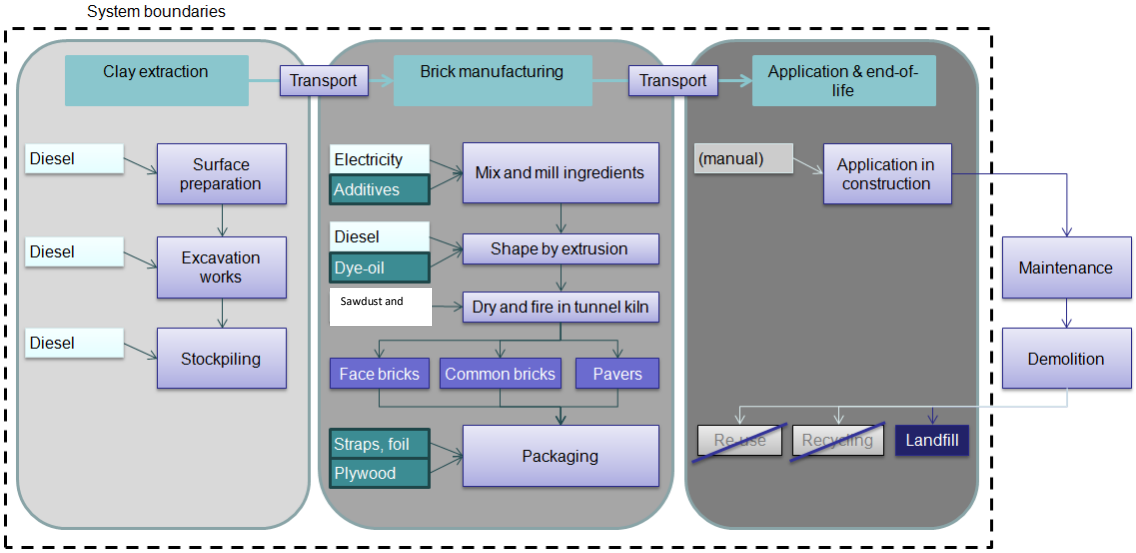


Figure 5: LCA System Boundary Diagram according to ISO14044 principles

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

For the purposes of this study, 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 impact of this exclusion on the footprint is small.

Austral Bricks Tasmania has applied a cut-off for flows smaller than 1% (mass and expected environmental impact). This means it has estimated environmental impacts, instead of collecting detailed information for these smaller emission sources.

Figure 5 shows how a product footprint is related to a company's emission reporting. Austral Bricks Tasmania reports its scope 1 & 2 emissions under the National Greenhouse and Energy Reporting Act 2007[4]. The footprint of bricks and pavers includes upstream and downstream emissions as well.

[4] Commonwealth of Australia 2007

Figure [1.1] The relationship between the *Corporate, Scope 3, and Product Standards* for a company manufacturing product A

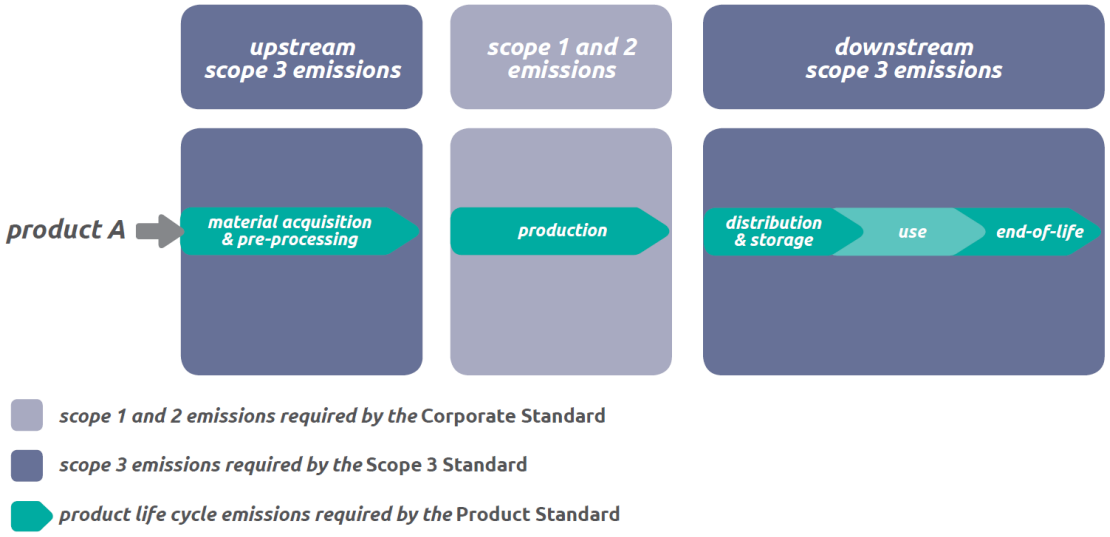


Figure 6: Relationship between GHG Protocol standards (Source: World Resources Institute and World Business Council for Sustainable Development 2011)

Austral Bricks Tasmania confirmed the definition of the system boundary in this study with requirements from the GHG Protocol Product Life Cycle Accounting and Reporting standard[5]. The system boundaries as defined by the GHG Protocol are slightly different from the ISO 14040 and ISO 14044 standards.

Based on this evaluation, Austral have added two emission sources to the footprint:

- Business travel of employees based in Longford,
- Company vehicles of employees based in Longford.

The system boundaries according to the GHG Protocol are depicted in Figure 7.

After inclusion of these additional items we believe all relevant requirements have been met.

[5] World Resources Institute and World Business Council for Sustainable Development 2011, Chapter 7

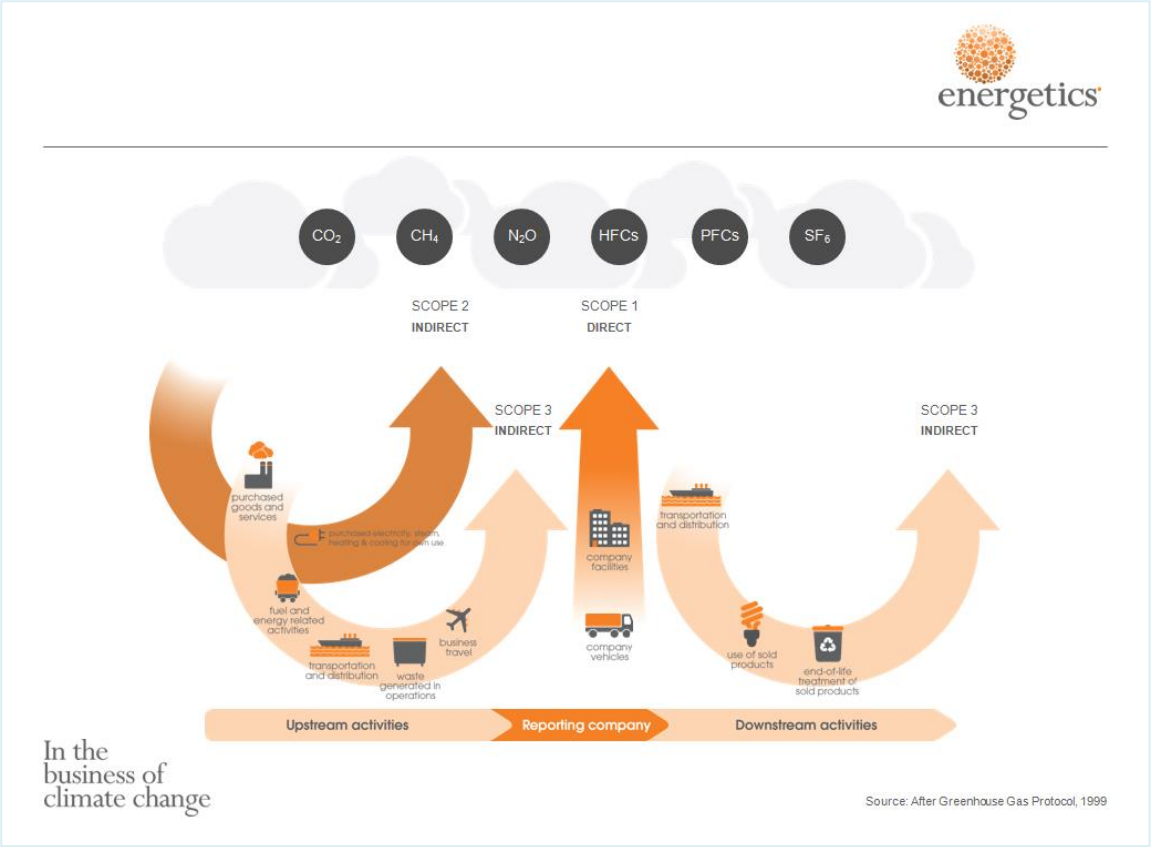


Figure 7: Emission sources covered by this LCA, GHG Protocol

2. Emissions reduction measures

2A. Emissions over time

	Table 1. Emissions since base year (tCO_2-e)						
	Base Year: 2012-13	Year 1: 2013-14	Year 2: 2014-15	Year 3: 2015-16	Year 4: 2016-17	Year 5: 2017-18	Current year Year 6: 2018-19
Scope 1	1,140	1,279	1,188	2,091	2,312	2726	2173
Scope 2	782	677	338	359	342	617	576
Scope 3	1,480	1,573	1,718	2,229	2,284	2434	2158
Scope 1 Calcination		139	136	153	150	155	147
Total	3,402	3,529	3,245	4,679	4,938	5,777	4907
Total including calcination		3668	3381	4832	5088	5932	5054

Austral Bricks Tasmania has reported emissions from calcination to the Clean Energy Regulator since via the National Greenhouse Gas and Energy Reporting Scheme (NGERS) since 2013-14. It is believed that

calcination was not included in the initial LCA for the carbon neutral brick. Calcination forms more than 1% of the sites scope I emissions. The error was identified in 2018, therefore Austral Bricks (Tas) Pty Ltd has purchased an additional 578 carbon units to compensate for the missing emission source since 2013-14. Calcination emissions have been estimated in accordance with the NGERS Measurement Determination 2018.

2B. Emissions reduction strategy

Austral Bricks Tasmania understands and accepts responsibility for environmental protection which is integral to the conduct of its commercial operations. Austral Bricks Tasmania's objective is to comply with all applicable environmental laws, regulations and community standards in a commercially effective way. Austral Bricks is committed to encouraging concern and respect for the environment and emphasising every employee's responsibility for environmental performance.

Reducing energy consumption, emissions and associated costs are key issues organisations are facing in a carbon constrained world with increasing energy prices. Austral Bricks Tasmania actively participates in greenhouse gas reporting scheme such as the National Greenhouse and Energy Reporting (NGER) Act 2007. This program requires organisations to measure and report their energy consumption, production and greenhouse gas emissions under strict protocols. The data is subsequently collated and reported to Senior Management and the Board.

Gas 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 currently being implemented.

Austral Bricks Tasmania produces low embodied carbon bricks fired in traditional kilns fuelled by saw dust at over 1000^{o}C. 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.

2C. Emissions reduction actions

During the reporting year, Austral Bricks (Tas) Pty Ltd continued to upgrade its lighting systems throughout the factory, replacing a total of 20 Fluorescent and Sodium Vapor with more efficient LED's and Induction type globes.

It is expected that the upgraded lighting system will further reduce the factory's scope 2 carbon emissions by 0.9 tonnes per year.

Austral Bricks has an ongoing maintenance schedule and in 2019, the kiln exhaust hood was replaced.

3. Emissions summary

Table 2. Emissions Summary		
Scope	Emission source	t CO_2-e
1	Calcination of clay	146.7
1	Truck vehicle fleet (diesel); on-site vehicles	235.4
1	Truck vehicle fleet (diesel); transport to customers, delivery trucks and company cars	398.5
1	Truck vehicle fleet (petrol); transport to customers, delivery trucks and company cars	3.6
1	Kiln fuel (bituminous coal) use	28.0
1	Kiln fuel (natural gas) use	1,341.8
1	Kiln fuel (saw dust) use	147.4
1	Body additive (coal) use	13.5
1	Body additive (sawdust) use	4.5
2	Longford plant electricity use	576.4
3	Truck vehicle fleet (diesel extraction & distribution); on-site vehicles	12.1
3	Truck vehicle fleet (diesel extraction & distribution); transport to customers, delivery trucks and company cars	20.3
3	Truck vehicle fleet (petrol extraction & distribution); transport to customers, delivery trucks and company cars	0.2
3	Kiln fuel (bituminous coal) production	12.4
3	Kiln fuel (natural gas) production and distribution	203.1
3	Kiln fuel (saw dust) production	0.0
3	Kiln fuel (bituminous coal) distribution	0.9
3	Kiln fuel (saw dust) distribution	59.3
3	Body additive (coal) production and distribution	0.0
3	Body additive (sawdust) production and distribution	0.0
3	Body additive (manganor) production and supply	3.1
3	Body additives transport to Longford	26.4
3	Longford plant electricity transmission and distribution losses	91.0
3	Clay, sand & shale extraction	39.7
3	Clay, sand & shale transport to Longford	171.5
3	Various face additives - extraction / production	93.0

3	Various face additives - transport to Longford	3.1
3	Overhead - water use	4.0
3	Overhead - waste water	5.7
3	Overhead - Cardboard to recycling	0.0
3	Overhead - Solid waste to landfill	23.5
3	Overhead - business travel	3.3
3	Packaging - Plastic Wrap - polyester strap	43.9
3	Packaging - Austral labels - PP film	1.2
3	Packaging - DR labels - PP film	0.9
3	Packaging - Pallets FUM -EXPORT	0.0
3	Packaging - Pallets -930 X 940	0.6
3	Packaging - Export plastic strap - polyester	1.1
3	Contractor vehicle fleet; off-site vehicles; transport to customers	581.3
3	Third party shipping; off-site; transport to customers	433.3
3	End-of-life - transport to landfill	322.8
3	End-of-life - bricks in landfill	0.0
Total Gross Emissions		5,054
GreenPower or retired LGCs		0
Total Net Emissions		5,054

4. Carbon offsets

4A. Offsets summary

Table 3. Offsets Summary					
Offset type and registry	Vintage	Year retired	Total eligible offsets	Quantity offsets cancelled for this Period	Serial numbers
VCU-APX VCS Registry Protection of a Tasmanian Native Forest	2013	2018	800	400	3229-145757334-145757733-VCU-016-MER-AU-14-587-01032012-28022013-0
VCU-APX VCS Registry Wind Based Power Generation by Mytrah Energy (India) Limited	2017	2018	6250	289	6137-281123336-281129585-VCU-034-APX-IN-1-1521-01012017-31122017-0
VCU-APX VCS Registry Chakala Wind Power Project in Maharashtra India	2016	2019	6000	4365	7068-368110465-368116464-VCU-034-APX-IN-1-1197-01012016-31122016-0
Total eligible offsets retired				2018 = 7050, 2019 = 7000	
Offsets banked in 2018 and used in this period				689	
Total offset units cancelled for this period				**5054**	
Net emissions after offsetting				0	
Total offsets banked for use future years:				1635 units retired and banked for the 2020 reporting year 7068-368110465-368116464-VCU-034-APX-IN-1-1197-01012016-31122016-0 1000 units retired and banked for the 2020 and 2021 reporting years 4147-176334640-176335639-VCU-016-MER-AU-14-641-16042012-15042013-0	

4B. Offsets purchasing and retirement strategy

Upon determination of final tonnes of carbon emissions required to be offset, Brickworks engages accredited providers (such as Carbon Neutral, South Pole Group and CBL Markets) of carbon offsets (such as VCUs) to purchase and surrender the offsets as required under the NCOS at the end of the reporting period. The carbon emissions to be offset are determined based on the production volume of the bricks and pavers during the reporting period (FY18-19).

The purchase and surrender of the offsets will occur within 4 months of the reporting period. It is Brickworks intention to purchase eligible offsets generated from Australia and NZ Projects as well as permits generated in overseas projects.

Brickworks endeavours to procure a portion of its carbon units from local Tasmanian forestry projects. These have been in short supply however 1000 units were available for purchase this year so these were procured and banked for the 2020 and 2021 reporting years.

To ensure that the Carbon Neutral Brick remains competitively priced, international credits are an important aspect to the purchasing strategy due to their low cost. Brickworks engages a broker to find clean energy projects such as wind power in Asia. The latest project in Chakala holds many co-benefits for the region.

4C. Offset projects (Co-benefits) optional

Austral Bricks supported the Redd Forests Grouped Project - Protection of a Tasmanian Native Forest (Vintage 2012 – 2013) by purchasing and retiring 400 Verified Carbon Units (VCU's). Austral Bricks is proud of supporting this project and uses it in its marketing material.

The remaining units supported international clean energy projects in India. The wind power project in Chakala was chosen for the following co-benefits as described in the product brochure:

Social well-being:

The project helps in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region such as development of roads and may promote business with improved power generation.

Project developers will use at a minimum 2% of the revenues accrued from the sale of carbon credits on an annual basis for community related activities. These include providing assistance for development of public amenities in the surrounding areas such as water distribution/sanitation facilities/building of schools and hospitals and free distribution of educational books and school uniforms, annual eye camps health checks for villagers.

Economic well-being:

The project is a clean technology investment in the region, which would not have taken place in the absence of the VCS benefits. The project activity will also help to reduce the demand supply gap in the state. The project will generate power using zero emissions wind based power generation which helps to reduce GHG emissions and specific pollutants like SOx, NOx, and SPM associated with the conventional thermal power generation facilities.

Environmental well-being:

Wind being a renewable source of energy, reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the Project activity avoids a significant amount of GHG emissions.

Technological well-being:

The successful operation of the project activity should lead to promotion of wind based power generation and would encourage other entrepreneurs to participate in similar projects.

5. Use of trade mark

Table 4. Trade mark register	
Where used	Logo type
Carbon Neutral Brick Brochure	Carbon Neutral Certificate Trade Mark (for product)
Austral Brick Website	Carbon Neutral Certificate Trade Mark (for product)
Austral Brick Tasmania Product Brochure	Carbon Neutral Certificate Trade Mark (for product)

Brickworks is in the process of updating its marketing material following the launch of Climate Active. All material containing the Climate Active trademark will be sent to Climate Active for approval as per the guidelines.