BORAL™

Boral Cement
Lime and Limestone Products EPD

ENVIRONMENTAL PRODUCT DECLARATION

ECO PLATFORM EPD VERIFIED

In accordance with ISO 14025 and EN 15804

EPD Registration Number S-P-02323
Issued 22 February 2022 | Valid until 22 February 2027
Geographical Scope: NSW, Australia

AUSTRALASIA EPD®

Contents

Program information and verification

An Environmental Product Declaration (EPD) is a standardised way of quantifying the potential environmental impacts of a product or system. EPDs are produced according to a consistent set of rules – Product Category Rules (PCR) – that define the requirements within a given product category.

These rules are a key addition to ISO 14025, ISO 14040 and ISO 14044 as they enable transparency and comparability between EPDs. This EPD provides environmental indicators for Boral Cement products manufactured in NSW. This EPD is a "cradle-to-gate" declaration covering production of lime and limestone products and their supply chain.

This EPD is verified to be compliant with EN 15804. EPD of construction products may not be comparable if they do not comply with EN 15804. EPDs within the same product category but from different programs or utilising different PCRs may not be comparable.

Boral, as the EPD owner, has the sole ownership, liability and responsibility for the EPD.

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Program information and verification

EPD Version:	1.0
Reference year for data:	2019-07-01 / 2020-06-30

CEN standard EN 15804 served as the core PCR	
PCR	PCR 2012:01 Construction Products and Construction Services, Version 2.33, 2020-09-18 PCR 2012:01-Sub-PCR-H, Product category rules Cement and Building Lime, version 2.31, 2020-09-18
PCR review was conducted by	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent verification of the declaration and data, according to ISO 14025	☐ EPD process certification (Internal) ☒ EPD verification (External)
Procedure for follow-up of data during EPD validity involved third-party verifier	☐ No ☒ Yes

About Boral

Boral is the largest integrated construction materials company in Australia, with a leading position underpinned by strategically located quarry reserves and an extensive network of operating sites. We also manufacture and supply a range of building products.

Boral Cement manufactures and supplies a wide range of cementitious products used by the building and construction industries of Australia. These products include both 'bulk' and 'bagged' cements, cement blends, and dry mixes with a variety of applications. They also produce a range of limestone and lime products.

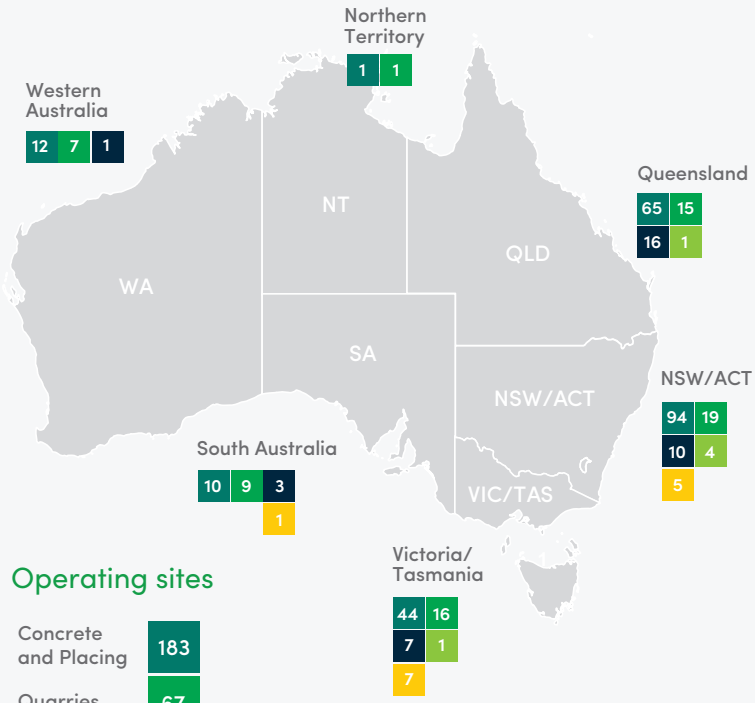
Boral Cement supplies Cementitious and Supplementary Cementitious Materials (ground granulated blast furnace slag (BFS) and fly ash) used by all segments of the construction industry including infrastructure, social, commercial and residential construction. They also ship the intermediate product clinker to customers and within the cement operating sites.

The products are grouped by type of product and will be presented in two EPDs:

1. Bulk cement and cementitious products

2. Bulk quicklime and limestone products

This EPD covers the bulk lime and limestone products.



Operating sites

Concrete and Placing	183
Quarries	67
Asphalt	37
Cement	6
Recycling	13

1. At 1 December 2021. Includes transport, fly ash and R&D sites. Concrete and asphalt sites include mobile plants. Excludes mothballed plants, distribution and administration sites.
2. Includes cement manufacturing, grinding, bagging and lime plants in NSW, a clinker plant in Victoria and a clinker grinding Joint Venture in Queensland.

How we work

At Boral, we have a culture of 'working together' with a focus on Zero Harm Today. Our first and foremost priority is the health and safety of our people, and all those whom we interact with through our operations. Our key focus is to strengthen the prevention of serious harm through more standardised and tailored controls that identify and mitigate our critical risks.

Boral has a team of full-time Health, Safety, Environment and Quality specialists who operate across our integrated business, offering a single interface for safety communications and innovation across raw materials, logistics, operations and placement.

Innovation and technical capability

The Innovation Factory is Boral's in-house centre of excellence responsible for developing advanced cement and concrete solutions for our customers. Through consultation with our customers, the Innovation Factory is central to enabling transformation through innovative products at Boral.

Our focus on engagement and action is backed by intensive research and development through our dedicated and talented team who work in collaboration with many sections of the company to create a world of future generations will be proud of.

About Boral

Technical Services

As one of Australia's largest construction materials companies, Boral is committed to excellence, providing customers with quality products and reliable service. Our aim is to provide products backed up by specialised testing as well as extensive quality control testing and technical support.

To ensure we remain at the forefront, we constantly improve, develop and refine our products to maintain the high standards customers have come to expect.

Our production, technical and quality managers are committed to quality excellence in our manufacturing process. We have committed additional resources to research and we strive to develop whole-of-life solutions that offer a sustainable future. Our innovative products are designed in collaboration with our clients.

Not only are we the only Australian construction materials company to maintain a full-service construction materials laboratory in Australia, **Boral Materials Technical Services is also the largest facility of its kind in the country**, providing special and standard testing and product development services to Boral and our customers.

Boral maintains an ISO 9001-certified Quality System to ensure we conduct a regular regime of physical properties testing on all materials to certify they:

- Meet Australian Standards in the civil and structural construction industry;
- Comply with applicable legislation, regulations and industry standards;
- Meet project specifications; and
- Allow for continuous improvement.

Boral laboratory facilities have a quality management system that meets international standards and they are NATA-accredited for construction materials testing and chemical testing. These customer-focused services have earned Boral the reputation of a market leader in its approach.

About Boral

Sustainability at Boral

At Boral, we recognise that as a leading Australian construction materials company, we have a unique opportunity and responsibility to do things right.

We are committed to leading the way in sustainability and creating a world that future generations will be proud of.

Our Sustainability Framework sets out our commitments to achieving this across four focus areas: Our People, Our Operations, Our Products and Our Performance.

About Boral

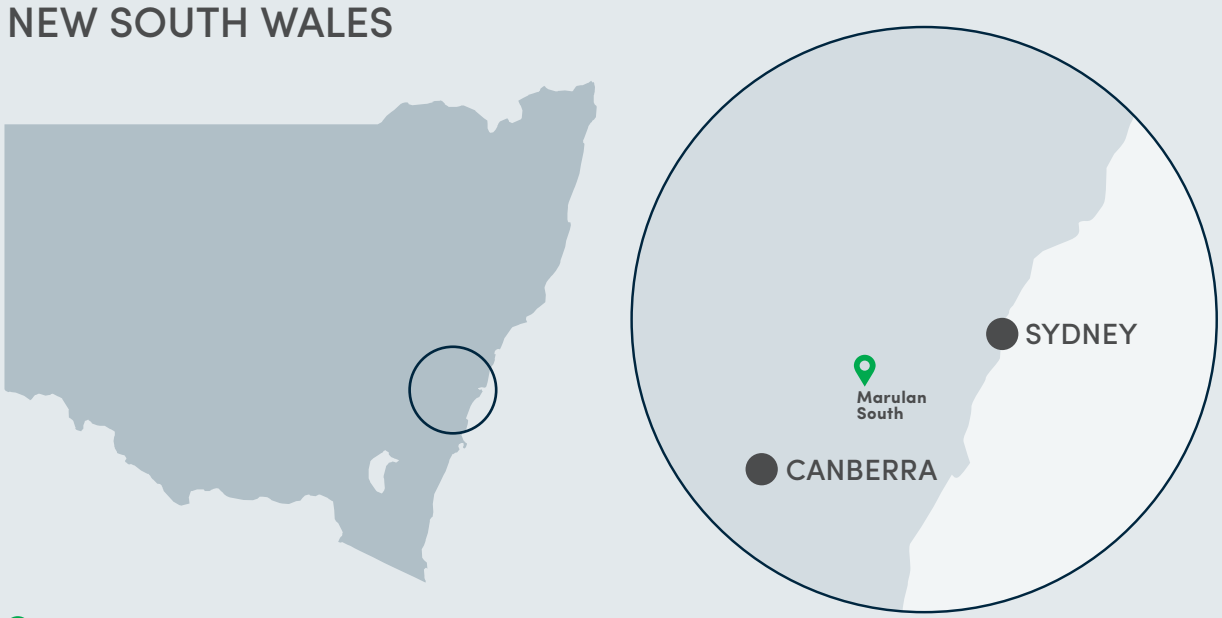
Our commitment

Our overarching goal is to deliver Zero Harm Today. This means we target zero injuries to our people and seek to eliminate adverse environmental impacts. Where elimination is not possible, we seek to minimise any harmful effects from our operations. At an absolute minimum, this means complying with environmental legislation, regulations, standards and codes of practice.

- Reducing greenhouse gas emissions from our processes, operations and facilities.
- Reducing waste in all forms including through the efficient use of energy, conservation of water, minimising and recycling waste materials and energy, prevention of pollution, and effective use of virgin and recovered resources and supplemental materials.
- Protecting biodiversity values at and around our facilities.
- Openly and constructively engaging with communities surrounding our operations.

Geographical scope

Limestone is extracted at the Boral Cement Marulan South operation in NSW, Australia. Some of the limestone is used to produce lime using our on-site lime kiln.



Declared products

Products covered by this environmental product declaration

The products included in this EPD are:

Marulan South – Bulk Limestone Products

Limestone Aggregates: Limestone aggregates produced to AS2758 Aggregates and rock for engineering purposes or supplied as specific customer specifications.

Manufactured Sands (limestone): Natural sand replacement produced to AS2758 Aggregates and rock for engineering purposes or as supplied as customer specifications.

Agricultural Lime (limestone): (M250 Aglime) is a high calcium carbonate, very fine agricultural lime with a typical Neutralizing Value of between 88-98 as per AOAC Test Method No. 955.01-1995, Neutralizing value for liming materials.

Marulan South – Bulk Lime Products

Quicklime: Pulverised quicklime manufactured and tested to AS 1672 Part 1 - 1997 Limes and Limestones.

Hydrated Lime: Finely ground hydrated lime to ensure the material is highly and consistently reactive. Manufactured and tested to AS 1672 Part 1 - 1997 Limes and Limestones.

Premium Hydrated Lime: Very finely ground hydrated lime to ensure the material is highly and consistently reactive. Manufactured and tested to AS 1672 Part 1 - 1997 Limes and Limestones.

Limestone and lime production

Boral's Marulan South Operations are located upon significant limestone and granodiorite deposits near the NSW Southern Tablelands town of Marulan. The Operations play an essential role in supplying aggregate and limestone-based building and construction materials to industry across NSW and the ACT.

Reflecting the two distinct rock resources available, the Operations consist of a limestone mine and processing plant, and a hard rock aggregates quarry (Peppertree Quarry).

The Peppertree Quarry (outside of the scope of this EPD) began operations in early 2014. The quarry where the granodiorite resource is being extracted is situated to the north of the Marulan South Limestone Mine. Up to 3.5 million tonnes of aggregates per year can be produced by the quarry at peak production. Materials are transported via rail to terminals at Maldon, St Peters and Enfield, from which they are distributed to customers via road.

The Marulan South Limestone Mine dates back as far as the 1830s when the first mining activities took place in the location. Positioned atop a significant limestone deposit directly to the south of the Peppertree Quarry, today's operations produce up to three million tonnes of limestone per year.

The majority of this limestone is sent by rail to the Berrima Cement Works where it is used in the production of cement clinker. The limestone is also used to make lime-based products for industrial purposes and agriculture.

The Marulan South Limestone Mine operates similarly to the Peppertree Quarry. Mining is conducted using modern open-cut hard rock drill-and-blast techniques. Material is conveyed from the mine to stockpiling and processing areas via haul truck. As with the neighbouring quarry, Marulan South Limestone is a 24 hour per day, seven day per week operation.

There is also a rotary kiln adjacent for use in lime production. Lime (calcium oxide) - also called quicklime - is produced in the kiln through the calcination of limestone (calcium carbonate) at a temperature of 900 °C to 1000 °C. Quicklime can be processed into hydrated lime by crushing the quicklime and adding water.

Limestone and lime production

Technical and functional characteristics

Boral Cement has a range of Lime and Limestone products specifically designed to deliver to the needs of our customers. Lime and Limestone products are used in a diverse range of applications including agriculture, asphalt, water treatment, steel manufacture, ground stabilisation, mining and general construction.

Quicklime

Quicklime is manufactured and tested to a level required by most users of pulverised quicklime to AS 1672 Part 1 – 1997 Limes and Limestones.

Quicklime has a wide variety of applications. It is used in the steel industry as a flux in purifying steel and other applications. It is supplied to civil contractors for use in stabilisation and soil modification. Furthermore, quicklime is used in treating industrial liquids and water.

Hydrated and Premium Hydrated Lime

Hydrated lime and Premium hydrated lime are very finely ground to ensure the material is highly and consistently reactive. They are manufactured to AS 1672 Part 1 – 1997 Limes and Limestones.

Hydrated lime is the hydrated oxide of calcium. When water is added to quicklime it hydrates (slakes) to form calcium hydroxide (hydrated lime).

Hydrated lime and Premium hydrated lime are supplied to the water treatment industry for softening, pH adjustment/coagulation and the removal of impurities. Hydrated lime is also used in the stabilisation of road surfaces, and as a filler in asphalt to improve resistance to high temperature rutting. Finally, hydrated lime is used to remove acidic gases, particularly sulphur dioxide and hydrogen chloride, from flue gasses.

Agricultural Lime

Agricultural lime (M250 Aglime) is produced by crushing, screening and processing through a cyclone classifier to convert naturally occurring limestone into a fine product that is used as an ameliorate in neutralising acidic soils. M250 is an effective soil neutraliser due to its high calcium carbonate content and very fine particle size. The effectiveness of a liming agent depends on its neutralising value (NV) and the material's fineness.

The typical NV of M250 Aglime is 88-98 as per AOAC Test Method No. 955.01-1995, Neutralizing value for liming materials.

Limestone Aggregates

Limestone aggregates are high calcium carbonate content products, which are low in impurities. They are constantly monitored during their production to ensure high and consistent quality and size at all times. This enables the supply of quality material to a range of industries, including cement and steel manufacturing processes. Limestone aggregates are also used in acid sulphate soil treatment, as high-grade CaCO3 fillers, in premix concrete and civil construction.

Limestone aggregates are produced to AS 2758 Aggregates and rock for engineering purposes or supplied as specific customer specifications.

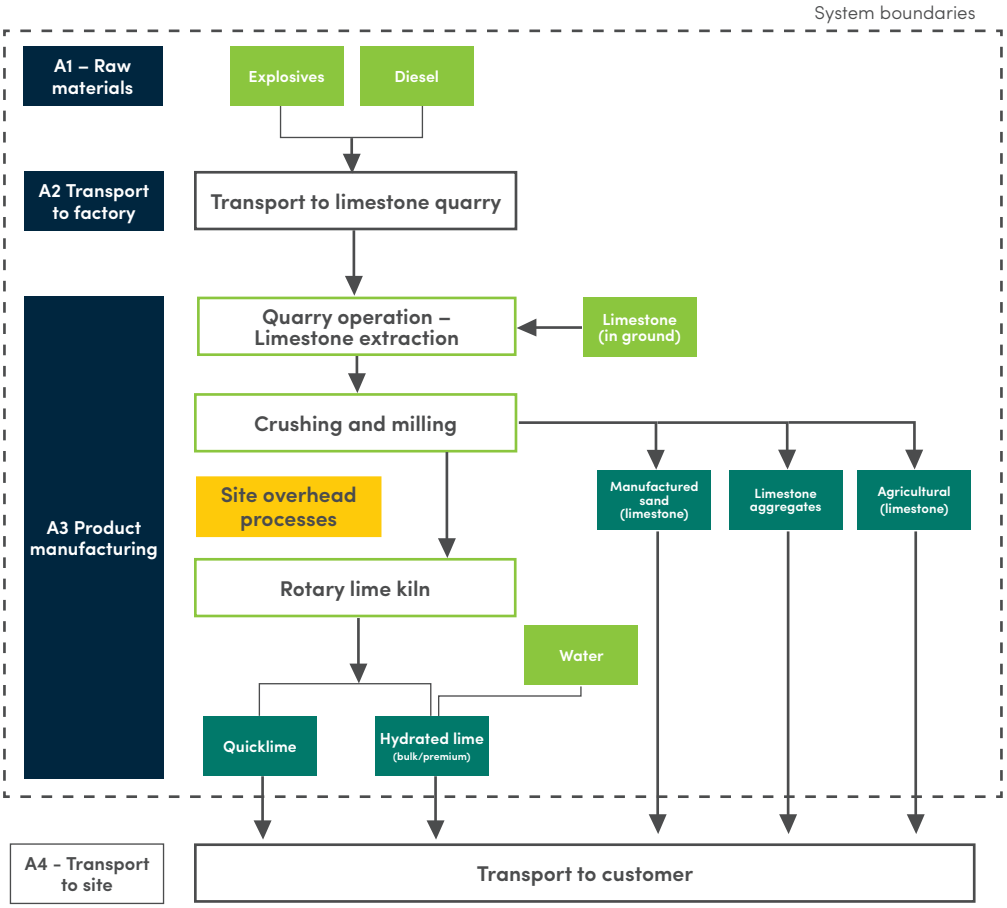
Further details on Lime and Limestone products, their use and design for different applications can be found on Boral's website, see https://www.boral.com.au/products/cement-and-lime

The product codes for lime products are UN CPC 374 (Plaster, lime and cement) and ANZSIC 2031 (Cement and Lime manufacturing). The product codes for Limestone products are UN CPC 15200 (Gypsum; anhydrite; limestone flux; limestone and other calcareous stone, of a kind used for the manufacture of lime or cement) and ANZSIC 09190 (Limestone quarrying).

Cradle-to-gate life cycle

This EPD covers the cradle-to-gate life cycle stages (A1-A3), as per diagram below. Downstream stages have not been included.

Figure 1. Cradle-to-gate life cycle of limestone quarrying and lime production.



Raw Material Stage A1

The main raw material input to the production of lime and limestone is the limestone that is extracted from Boral Cement's Marulan South Limestone Mine. As the limestone occurs naturally, the only raw materials that are transported to site are explosives and fuels used in the quarry and rotary kiln.

Transportation Stage A2

Explosives and fuel are transported to our site via articulated trucks.

Manufacturing Stage A3

Limestone is extracted from the quarry and moved through a series of crushers and screens. A portion of this limestone goes through a rotary kiln to produce (quick)lime. Boral also produces hydrated lime, which is formed by slaking lime with water. The manufacturing stage (A3) for lime and limestone products ends with the storage of the products when they are ready for dispatch to clients. This is typically described as the cradle (A1) to gate (A3) life cycle (see table 1).

Cradle-to-gate life cycle

Table 1: Scope of EPD

Product Stage			Construction Stage		Use Stage							End-of-life Stage				Benefits beyond system boundary
RAW MATERIAL SUPPLY	TRANSPORT	MANUFACTURING	TRANSPORT	CONSTRUCTION-INSTALLATION PROCESS	USE	MAINTENANCE	REPAIR	REPLACEMENT	REFURBISHMENT	OPERATIONAL ENERGY USE	OPERATIONAL WATER USE	DECONSTRUCTION DEMOLITION	TRANSPORT	WASTE PROCESSING	DISPOSAL	REUSE, RECOVERY, RECYCLING POTENTIAL
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
			Scenario		Scenario							Scenario				
✔	✔	✔	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

✔ = module is included in this study MND = module is not declared*

* When a module is not accounted for, the stage is marked with "MND" (Module Not Declared). MND is used when we cannot define a typical scenario.

Life Cycle Assessment (LCA) methodology

Background data

Boral has supplied primary data from our raw material quarry and lime production facility located at our limestone mine at Marulan South.

Background data for other input materials (explosives), energy and transport processes, have predominantly been sourced from AusLCI and the AusLCI shadow database (v1.36) (AusLCI 2021).

The limestone quarry and lime kiln data have been collected for financial year 2020 (1 July 2019 – 30 June 2020). As a result, the vast majority of the environmental profiles of our products are based on life cycle data that are less than five years old. Background data used are less than 10 years old.

Methodological choices have been applied in line with EN 15804 (CEN 2013); deviations have been recorded.

Allocation

The key production processes that require allocation are:

- **Limestone:** Limestone products are produced through quarrying and crushing of limestone rock, which is graded in different sizes. The energy required for the crushing and screening does not differentiate between products. Therefore, limestone production (including manufactured limestone sand) has been allocated based on the mass of product.
- **Lime products:** energy use for production has been allocated to the products based on a mass basis (total tonnage of product) at the greatest level of detail available. Kiln energy is attributed to quicklime (run-of-kiln) and thus equally divided across all quicklime products. Hydrated lime products consist of quicklime and water and receive impacts according to their quicklime content.

Cut-off criteria

- The contribution of capital goods (production equipment and infrastructure) and personnel is outside the scope of the LCA, in line with the PCR (Environdec 2020a).
- The packaging used for explosives is well below the materiality cut-off and these materials have been excluded.

Key assumptions

- The environmental profiles are largely influenced by the primary data, which are considered of very high quality. The choices outlined above are therefore also the key assumptions impacting the results.

Product composition

The nominal product compositions of the limestone and lime products included in this EPD are presented in the following tables.

Table 2. Limestone product compositions

Components (%)	Limestone ($CaCO_3$)	Magnesium Carbonate ($MgCO_3$)	Silicon Dioxide (SiO_2)
Limestone Products (aggregates, manufactured sand, agricultural lime)	88-100	<2	<6

Table 3. Quicklime product compositions

Components (%)	Calcium Oxide (CaO)	Magnesium Oxide (MgO)	Aluminium Oxide (Al_2O_3)	Silicon Dioxide (SiO_2)
Quicklime	>90	<2	<1	<3

Table 4. Hydrated and Premium Hydrated Lime product compositions (as oxide)

Components (%)	Calcium Oxide (CaO)	Magnesium Oxide (MgO)	Aluminium Oxide (Al_2O_3)	Silicon Dioxide (SiO_2)
Hydrated Lime	>71	<1	<1	<2.5
Premium Hydrated Lime	>71.5	<1	<1	<2

The products included in this EPD do not contain any substances of very high concern as defined by European REACH regulation in concentrations > 0.1% (m/m).

Calcium oxide (lime; quicklime) and calcium hydroxide (hydrated lime) are considered Hazardous. The substances cause serious eye damage causes skin irritation and may cause respiratory irritation if not handled appropriately.

Further details on Lime and Limestone product specifications and Safety Data Sheets can be found on Boral's website, see **https://www.boral.com.au/products/cement-and-lime**

Declared unit

The background LCA serves as the foundation for this EPD. An LCA analyses the environmental processes in the value chain of a product. It provides a comprehensive evaluation of all upstream (and sometimes downstream) material and energy inputs and outputs. The results are provided for a range of environmental impact categories, in line with EN 15804 (CEN 2013).

Our range of Lime and Limestone products are specifically designed for our clients' applications. The declared unit that is used for all the products is: 1 tonne (1,000 kg) of limestone or building lime.

This declared unit has been adapted from the sub-PCR (Environdec 2020b), which is based on EN 16908:2017 (CEN 2017).

All results are presented per declared unit and cover the A1-A3 life cycle stages (cradle-to-gate).

Environmental indicators

Table 5. Impact categories included in this assessment

Impact category	Acronym	Unit
Global Warming Potential	GWP	kg CO_2 equivalents
Ozone Depletion Potential	ODP	kg CFC-11 equivalents
Acidification Potential of soil and water	AP	kg SO_2 equivalents
Eutrophication Potential	EP	kg PO_4^{3-} equivalents
Photochemical Ozone Creation Potential	POCP	kg C_2H_4 equivalents
Abiotic Depletion Potential for Mineral Elements	ADPE	kg Sb equivalents
Abiotic Depletion Potential for Fossil Fuels	ADPF	MJ

Table 6: Parameters describing resource use, waste and output flows

Resource use	Acronym	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ_{NCV}
Use of renewable primary energy resources used as raw materials	PERM	MJ_{NCV}
Total use of renewable primary energy resources	PERT	MJ_{NCV}
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ_{NCV}
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ_{NCV}
Total use of non-renewable primary energy resources	PENRT	MJ_{NCV}
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ_{NCV}
Use of non-renewable secondary fuels	NRSF	MJ_{NCV}
Use of net fresh water	FW	m^3
Waste categories		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Output flows		
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy	EE	MJ

Environmental profiles

The cradle-to-gate (module A1-A3) environmental profiles and environmental parameters of each product group are expressed per tonne of limestone, lime or hydrated lime produced in Marulan, NSW.

The environmental parameters are based on the life cycle inventory. There can be some ambiguity around their presentation, and this should be considered when comparing EPDs.

Limitations

This study presents a 'cradle-to-gate' life cycle assessment of Lime and Limestone products produced by Boral in Marulan South, NSW.

The results use characterisation methods and models as specified in EN15804:2012+A1:2013 and may not be comparable to EPDs following different standards (including EN15804:2012+A2:2019), characterisation methods or models.

The main limitations of the LCA results are found in the parameter results, which can be highly dependent on background data.

The results of this study and the EPD are valid for Boral products only. Products from other manufacturers will likely have different impacts due to differences in manufacturing processes.

Environmental profiles

Table 7. Environmental profiles, stages A1-A3, per tonne

Indicator	Unit	Limestone aggregates	Manufactured sand (limestone)	Agricultural Lime (limestone)
GWP	**kg CO_2 eq**	**11.3**	**11.3**	**11.3**
ODP	kg CFC11 eq	5.43E-07	5.43E-07	5.43E-07
AP	kg SO_2 eq	0.0443	0.0443	0.0443
EP	kg PO_4^{3-} eq	0.0104	0.0104	0.0104
POCP	kg C_2H_4 eq	0.00400	0.00400	0.00400
ADPE	kg Sb eq	8.90E-07	8.90E-07	8.90E-07
ADPF	MJ_{NCV}	124	124	124

Table 8. Environmental parameters, stages A1-A3, per tonne

Parameter	Unit	Limestone aggregates	Manufactured sand (limestone)	Agricultural Lime (limestone)
PERE	MJ_{NCV}	3.29E+00	3.29E+00	3.29E+00
PERM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
PERT	MJ_{NCV}	3.29E+00	3.29E+00	3.29E+00
PENRE	MJ_{NCV}	1.29E+00	1.29E+00	1.29E+00
PENRM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ_{NCV}	1.29E+00	1.29E+00	1.29E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00
RSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
FW	m^3	3.32E-02	3.32E-02	3.32E-02
HWD	kg	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	5.12E-02	5.12E-02	5.12E-02
RWD	kg	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00

Environmental profiles

Table 9. Environmental profiles, stages A1–A3, per tonne

Indicator	Unit	Quicklime products	Bulk Hydrated Lime products	Premium Hydrated Lime products
GWP	**kg CO_2 eq**	**1410**	**1100**	**1100**
ODP	kg CFC11 eq	1.27E-06	9.95E-07	9.95E-07
AP	kg SO_2 eq	0.950	0.742	0.742
EP	kg PO_4^{3-} eq	0.247	0.193	0.193
POCP	kg C_2H_4 eq	0.0510	0.0399	0.0399
ADPE	kg Sb eq	1.69E-06	1.32E-06	1.32E-06
ADPF	MJ_{NCV}	10900	8490	8490

Table 10. Environmental parameters, stages A1–A3, per tonne

Parameter	Unit	Quicklime products	Bulk Hydrated Lime products	Premium Hydrated Lime products
PERE	MJ_{NCV}	6.89E+01	5.39E+01	5.39E+01
PERM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
PERT	MJ_{NCV}	6.89E+01	5.39E+01	5.39E+01
PENRE	MJ_{NCV}	1.09E+04	8.49E+03	8.49E+03
PENRM	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ_{NCV}	1.09E+04	8.49E+03	8.49E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00
RSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.48E-01	4.13E-01	4.13E-01
HWD	kg	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.93E+00	1.51E+00	1.51E+00
RWD	kg	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00

Other environmental information

Water management

Water is a valuable resource and essential to our manufacturing operations for dust suppression, cooling, cleaning and sanitation. All of our operations have the ability to capture rainfall run-off for reuse via specially designed detention basins, dams or extraction voids. While captured and onsite recycled water is used in the first instance, we also rely on licenced surface water and groundwater sources to meet our needs.

During drought conditions onsite water availability can be limited. We are actively looking at improving our water supplies at our operations including:

- Piping groundwater from the former Berrima Colliery workings to the Berrima Cement Works.
- Using tertiary treated effluent at our Marulan South operations.

Waste and recycling

At Berrima, to reduce our reliance on coal, we have approval to use non-standard fuels with defined fuel specifications, including Solid Waste Derived Fuels such as wood waste and refuse derived fuels, carbon anodes from the aluminium industry and used shredded/chipped tyres. These fuels are derived from waste that normally would end up in landfill.

At Berrima we use steel slag and granulated blast furnace slag as a raw feed in our clinker production to reduce the use of virgin limestone and reduce calcination emissions. We also use granulated blast furnace slag in some of our cement and stabilisation binder products at Maldon.

Biodiversity management

Protecting the diversity of plant and animal species at and around our operational sites is a core component of our land management efforts. Some examples from within the Cement operations include:

- Establishing a biodiversity stewardship site at Coolumburra, NSW, to offset vegetation clearing at our Marulan South operations.
- Working with local experienced wildlife handlers and carers to relocate fauna that could be displaced because of vegetation removal activities.

Through our community partnership with Conservation Volunteers Australia, we support conservation and education initiatives in our local communities, including vegetation initiative in local reserves and schools.

Our approach to climate related risks

Our approach

Boral recognises that climate related physical risks and a global transition to a low-carbon future are expected to impact our operations, customers and suppliers.

We support the Paris Agreement and mechanisms to achieve its objective of limiting future average global temperature rises to well below 2°C, as well as Australia's 2030 target of a 26–28% reduction in carbon emissions below 2005 levels.

Looking at how Boral's carbon emissions are tracking relative to 2005 levels, in Australia we have reduced emissions by around 40% since FY2005. We achieved about half of this decrease largely by realigning our portfolio away from emissions-intensive businesses. The remainder of the decrease is due to reducing clinker manufacturing in Australia in favour of importing it from more efficient and larger scale operations in Asia. Including Boral North America, our Scope 1 and 2 emissions decreased by 43% since FY2005.

We continue to progressively adopt the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). In FY2019, we enhanced our climate-related governance and risk management, completed scenario analysis of Boral Cement's business and continued to strengthen our resilience to a 2°C scenario. We also broadened our reporting of physical climate-related risks and Scope 3 emissions.

We completed a Group-wide review of our climate-related risks and opportunities using the TCFD framework. This review informed a two-year roadmap to undertake further scenario analysis of key climate related business risks. We transparently and constructively engaged with Climate Action 100+ investor representatives and other stakeholders during the year, sharing our progress in aligning our efforts with the TCFD recommendations and building greater resilience to climate-related impacts.

Our approach to climate related risks

Energy and climate policy

Boral has not identified any major positions on energy and climate policy held by our industry associations that are materially inconsistent with Boral's position.

We support:

- A national approach to climate and energy policy to ensure that least-cost carbon emissions abatement is targeted while ensuring reliable and competitive energy can be delivered.
- Climate and energy policies that do not unduly erode the competitiveness of domestic-based businesses.

Through our community partnership with Conservation Volunteers Australia, we support conservation and education initiatives in our local communities, including native vegetation initiatives in local reserves and schools.

In Australia, we are a member of the Cement Industry Federation (CIF). The CIF policy is to support the Federal Government's national target to reduce emissions by 26–28 per cent by 2030, and the CIF has been working with the World Business Council for Sustainable Development and its current roadmap to reduce emissions.

Boral acknowledges the Paris Agreement and supports mechanisms to achieve its objectives, including a national approach to climate and energy policy. Boral's major industry associations are:

- Business Council of Australia (BCA)
- Cement Industry Federation (CIF)
- Cement, Concrete & Aggregates Australia (CCAA)
- Australian Flexible Pavement Association (AfPA)
- American Coal Ash Association (ACAA)

For more information visit

https://www.boral.com/sites/corporate/files/media/field_document/Industry-associations-2020_0.pdf

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