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ABN: 59 008 468 639
Cement Industry Federation

The Cement Industry Federation (CIF) is the national body representing the Australian cement industry. CIF membership is made up of the three major Australian cement producers - Adelaide Brighton Ltd, Boral Cement Ltd and Cement Australia Pty Ltd.

Together these companies account for 100 per cent of integrated cement production in Australia.

Our vision is for a productive and economically sound industry that delivers high quality cementitious products in an environmentally responsible manner, while at the same time looking after and rewarding employees, contributing to local communities and assisting in the development of the Australian economy in general.

Key Industry Facts

<table>
<thead>
<tr>
<th>Metric</th>
<th>2018-19</th>
<th>2017-18</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinker</strong> Production</td>
<td>5.61</td>
<td>- 2.0%</td>
<td>- 13%</td>
</tr>
<tr>
<td>(2010-11 = 6.47 Mt)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Cement</strong> Production</td>
<td>10.4</td>
<td>+ 8.5%</td>
<td>+ 18%</td>
</tr>
<tr>
<td>(2010-11 = 8.81 Mt)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Cementitious</strong> Sales</td>
<td>11.5</td>
<td>- 3.0%</td>
<td>+ 7.0%</td>
</tr>
<tr>
<td>(2010-11 = 10.3 Mt)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Total GHG Emissions</strong></td>
<td>5.1</td>
<td>+ 2.0%</td>
<td>- 18%</td>
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<tr>
<td>(2010-11 = 6.48 Mt)</td>
<td></td>
<td></td>
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<tr>
<td><strong>GHG Emissions Intensity</strong></td>
<td>0.77</td>
<td>- 3.0%</td>
<td>- 17%</td>
</tr>
<tr>
<td>(2010-11 = 0.94 Mt CO2e/t cement*)</td>
<td></td>
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</tbody>
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* Cement produced from clinker produced on site
Australia’s Integrated Cement Manufacturing Industry

A key investor in Australian jobs and regions for over 120 years

We employ around 1,300 Australians directly and create over 5,000 jobs in key downstream markets.

We add significant value to Australia’s mineral and energy resources

We provide a critical sustainable ingredient that underpins Australia’s infrastructure – from roads and bridges.....

.....to family homes and commercial buildings
What is Cement?

Many people do not realise cement and concrete are different materials.

Cement is a binder material manufactured from limestone, clay and sand. It is a key ingredient in concrete.

Concrete is the final building and construction material made from a mixture of cement, crushed stone/gravel, sand and water.

What is Cement Used for?

Construction of a typical family home requires around 14 tonnes of cement. A kilometre of freeway contains as much as 2,500 tonnes of cement.

The pre-mixed concrete industry consumes the greatest volume of cement, using it in applications such as: concrete slabs and foundations for buildings, roads and bridges, precast panels, blocks and roofing tiles, fence posts, reservoirs and railway sleepers – to name a few.

Cement is also used in bulk quantities in other diverse applications including: stabilisation of roads and rocky surfaces, backfill mining operations, casings in oil and gas wells, as well as renders, mortars and fibre board.

Growth in demand for cement is closely linked to Australia’s economic growth, providing long-term investment and employment stability. Cement manufacturing and distribution provide jobs and investment in regional Australia as well as the suburban and industrial areas of our cities.

How is Cement Made?

There are three main stages of cement production:

**Stage 1: Raw Material**

**Stage 2: Clinker**

**Stage 3: Cement**

**Figure 1: Schematic of a typical integrated cement manufacturing plant**

The process begins with the mined raw materials being ground into a raw meal ready for the kiln. This precise mixture of ground limestone, clay and sand is heated in the pre-calciner before being fed into the kiln where it is transformed (calcined) into clinker at very high temperatures – typically around 1,450°C.

The resulting clinker exits the kiln as a small, stone-like material comprised of the special compounds that give cement its binding properties. From here it is cooled and then ground with gypsum and other materials to make cement, which is then sent on to market either in bulk or bagged form.

A modern integrated cement plant incorporates technology and practices that makes the most efficient use of heat throughout the plant.
Where is Cement Produced in Australia?

There are five integrated manufacturing facilities in Australia operated by CIF member companies – Adelaide Brighton, Boral Cement and Cement Australia. The resulting cement is delivered to market through around 20 distribution centres.

Integrated cement manufacturing facilities are located in New South Wales, Queensland, South Australia and Tasmania (Figure 2), providing employment and investment in the areas in which they operate.

Figure 2: Location of integrated cement manufacturing sites
Australian Cement Production

Cement has been produced in Australia for over 120 years, underpinning the development of Australia’s major infrastructure landscape as well as the residential and commercial construction sector.

Australian cement production has been building steadily since the Global Financial Crisis before reaching record levels in 2018-19 – primarily on the back of growing demand from major infrastructure projects and the construction market in general.

This increased demand for cement has led to a significant growth in clinker imports – a trend that has been consistent over the last five or so years, culminating in a record 4.1 million tonnes imported in 2018-19.

An increasing amount of cement is also being imported into Australia, with around 0.9 million tonnes coming into the country to satisfy demand in 2018-19.

Clinker production was 5.6 million tonnes in 2018-19, up 2 per cent year-on-year.

Clinker imports were 4.1 million tonnes in 2018-19, a rise of 4 per cent year-on-year after a 15 per cent increase the year before. Clinker imports are now double what they were in 2010-11 (Figure 3).

Cement production was 10.4 million tonnes in 2018-19, up 9 per cent over 2017-18. Increased cement production has been required to meet consistent demand (Figure 4).

Cement imports were 0.9 million tonnes in 2018-19, a drop of around 7 per cent compared to 2017-18 levels. Cement imports had been relatively stable between 2013-14 and 2016-17 before a significant (262%) year-on-year increase was recorded in 2017-18.

Source: Australian Bureau of Statistics
Figure 3: Clinker Production and Imports
Source: CIF Survey, Australian Bureau of Statistics

Figure 4: Cement Production and Imports
Source: CIF Survey, Australian Bureau of Statistics

*ABS import data includes clinker/cement imported by non-CIF members*
Cement Industry Vision for a Sustainable Industry

Our vision is for a productive and economically sound integrated cement manufacturing industry that delivers high quality cementitious products in an environmentally responsible manner, while at the same time looking after and rewarding employees, contributing to local communities and assisting in the development of the Australian economy in general.

**Australian integrated cement producers have long recognised the importance of the sustainable manufacture of clinker and cement.**

The Australian integrated cement industry’s Sustainability Framework articulates key aspects of the Industry Vision and the continued focus of CIF members on the sustainable manufacture of clinker and cement.

The Sustainability Framework is based on the key sustainability principles of social responsibility, environmental stewardship and economic prosperity – while acknowledging the critical importance of maintaining the health and safety of all stakeholders.

Figure 5: CIF Sustainability Framework
Health and Safety

CIF member companies are committed to maintaining the health and safety of all those involved in cement manufacturing and use. This is the core of our Sustainability Framework.

The health, safety and general wellbeing of employees and contractors is a critical aspect of the sustainable production of clinker and cement.

All CIF member companies have programs and measures in place focussed on promoting awareness of health and safety in their organisations – including risk identification, implementation of critical controls, injury prevention programs, as well as hazard and incident reporting.

All CIF members strive to eliminate workplace injuries in all aspects of their operations. Key to achieving this includes the implementation of effective safety management systems, along with everyone being responsible for monitoring and responding to risk in the workplace.

CIF members are committed to the overall health and wellbeing of their workforce. Examples of initiatives include employee assistance programs, occupational hygiene programs, health and fitness checks, drug and alcohol support, quit smoking programs as well as health seminars.

Maintaining ongoing safety and health awareness, as well as continual improvement in safety culture and systems, underpins the safe and sustainable production of clinker and cement in Australia.
Key social components of the CIF’s sustainability framework include the people engaged in our industry, how we engage with stakeholders and give back to the local communities in which we operate, as well as our industry’s commitment to diversity and inclusion in the workplace.

Human Resources

The success of Australia’s integrated cement manufacturers is founded on the people they employ to sustainably produce and deliver high quality cementitious products to customers.

Around 1,270 people are directly employed by CIF member companies in the production and distribution of clinker, cement and cementitious products (Figure 6).

Approximately 5,000 additional people are involved indirectly in directly related downstream employment.

Our industry is committed to developing a strong leadership culture amongst its workforce with an ongoing commitment to key areas including safety, health, environment and sustainability management, diversity and inclusion.

CIF member companies strive to provide a workplace environment that develops and encourages highly skilled and motivated employees that take pride in what they do and the industry within which they work.

Figure 6: CIF Direct Employment
Community Engagement

CIF member operations have a significant presence in the communities in which they are located, providing employment and associated benefits to these local communities and the economy more broadly.

CIF members communicate and engage with members of their local communities through community consultative groups, community partnerships, newsletters, site tours as well as regular community meetings with key stakeholders on specific issues as required.

Developing and maintaining a strong positive relationship with the local communities in which our members operate is viewed as essential to ensure a strong, vibrant and sustainable future for the individual operations and the industry as a whole.

Cement Australia

“Our two major operations, Gladstone and Railton are based in regional areas, where our activities and our employees form a significant presence.

Cement Australia Railton have long worked with our neighbours and communities to create partnerships based on a foundation of mutual respect and long term commitment with the aim of ensuring our community partnerships create high quality outcomes through enduring relationships.

Since the Fisherman’s Landing plant began production, Cement Australia has become one of the major employers of the Gladstone region. Through Fisherman’s Landing and the nearby East End Mine at Mt Larcom, Cement Australia plays an important role in the local community.

Cement Australia’s Fisherman’s Landing and East End operations work closely with local interest groups and are committed to actively supporting the communities in which they operate.”

Boral Cement

"We have a long and proud history of supporting the communities in which we operate. We are committed to being a socially responsible and valued member of those communities and making a positive and sustainable contribution to their well-being.

Our community investment framework is built around our 'People, Places and Products.' This framework helps us identify organisations and projects that share our values and where our resources can have the greatest impact."

Adelaide Brighton

"As an employer, neighbour, customer and supplier in locations in every state of Australia, we strive for a positive impact in the communities where we operate. We recognise our social responsibilities and strive to continuously improve our performance in the areas of health, safety, environment and community.

We continually look for ways to strengthen our engagement with the community to build long term and meaningful relationships for the continued successful operation of our businesses. We do this by understanding and managing our impacts and by developing and implementing initiatives that deliver meaningful benefits."

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1 Source: www.boral.com/community-sustainability/community-partnerships
Contributing to Local Communities

CIF members value the communities in which they operate and have a long history of investing time, skills and resources in people, facilities and community-based programs.

Examples include organising local events, community partnerships, sponsorships, donations to school programs, sporting clubs, care agencies, child services, higher education programs and vegetation programs to name a few.

Our members take pride in their commitment to being a socially responsible member of the communities in which they operate.

Diversity and Inclusion

The CIF and its members are committed to providing inclusive workplaces that value and promote diversity.

An inclusive workplace culture that respects and encourages diversity supports the long-term well-being and success of individual employees of CIF members and fosters increased productivity, creativity and employee engagement.

Diverse perspectives can also drive innovation and critical thinking which are essential qualities that will underpin the long-term sustainability of our industry.
The Australian cement industry is committed to the prevention of pollution and controlling the impacts of its activities on the environment.

Cement Industry and Emissions

The Australian cement industry recognises the challenge that a changing climate poses to our natural environment, both at a regional and global scale, and supports efforts to reduce emissions.

Strong action already taken by the Australian cement industry has resulted in significant reductions in carbon emissions from our sector – with a reduction in total emissions of over 20 per cent since 2010-11.

The manufacture of Portland cement involves the conversion of limestone into clinker. This chemical process generates carbon dioxide and is the main source of greenhouse gas emissions from the cement production process.

Process emissions accounted for around 60 per cent of the industry’s GHG emissions in 2018-19 (Figure 7). Approximately 30 per cent of emissions resulted from the burning of fuels such as coal, gas and diesel to generate heat for the process, and the remaining 10 per cent generated from the consumption of electricity across the facilities.

Total emissions from the integrated production of clinker and cement were 5.1 million tonnes CO\textsubscript{2}-e in 2018-19. This represents a 2 per cent increase over 2017-18 levels (Figure 8).

The emissions intensity of cement manufacturing expressed in terms of total cement produced from clinker produced on site was 0.77 t CO\textsubscript{2}-e in 2018-19 – an improvement of around 3 per cent over 2017-18 levels and a 17 per cent reduction over 2010-11 (Figure 9).
Our industry remains committed to working with all levels of government in the development and application of climate and energy policy that strives to reduce GHG emissions in line with our international commitments, while at the same time ensuring the long-term viability of Australia’s cement industry and the communities in which they operate.

**Figure 8: Total CIF cement greenhouse gas emissions**
*Source: CIF Survey*

**Figure 9: Emissions intensity of Australian cement manufacturing**
*Source: CIF Survey*
Emission Reduction Opportunities

The Australian integrated cement manufacturing industry has achieved a reduction in GHG emissions of more than 20 per cent since 2010-11. This has largely been achieved through significant investment in new, lower emissions kiln technology over the period.

Around 98 per cent of Australian manufactured clinker is now produced using highly efficient suspension preheater precalciner technology (Figure 10).

Focussed efforts on increasing the use of alternative fuels and raw materials as well as energy efficiency measures in general have also contributed to historical emissions reductions.

The cement industry both in Australia and globally has been at the forefront of identifying actions to reduce emissions. Cement producers collaborated in 2009 with the World Business Council for Sustainable Development (WBCSD) Cement Sustainability Initiative (CSI) and the International Energy Agency (IEA) to develop the first sectoral Cement Technology Roadmap.

This Roadmap was updated in 2018 with the theme of a low-carbon transition in the cement industry and identifies four main carbon mitigation levers available to the cement sector: alternative fuels, clinker substitution, energy efficiency and carbon capture, storage and utilisation.

Of these options, carbon capture and storage and reducing the clinker content in cement are expected to deliver the largest cumulative emissions reductions, followed by the increased use of alternative fuels and energy efficiency.
Alternative Fuels and Raw Materials (AFRs)

There are a number of materials that can substitute for the natural resources that supply both the minerals and/or energy required for clinker and cement production. These alternative fuels and raw materials are typically by-products of other industrial processes or waste materials that would otherwise be disposed of.

Examples of the types of alternative fuels used in the Australia cement industry include wood waste, carbon powders, used oils and solvents, as well as spent cell liners from aluminium production that would otherwise become waste.

Currently alternative fuels meet around 15 per cent of the total energy requirements of the Australian cement industry (Figure 11). This is approaching the global average of around 16 per cent as Australian producers continue to seek out and opportunities to increase AFR usage in their operations.

Key issues that impact the uptake of AFRs in Australia include: the distance between AFR source and kiln, the costs associated with transport of AFR to relatively remote kiln locations, landfill costs not deterring disposal of wastes that have calorific value, access to long term and reliable sources of AFRs, regulatory impediments, as well as capital costs associated with required infrastructure.

The major regulatory impediment is the inconsistent waste regulation across jurisdictions. Differing approaches to and application of policy instruments impact on the availability of waste material for energy recovery – and therefore limit the options available to cement kilns.

All CIF members are working to increase the safe uptake of alternative fuels in their operations. Doing so not only reduces the amount of fossil fuels required to produce cement and therefore GHG emissions, it also makes use of materials that would otherwise be considered a waste – thereby contributing to the circular economy.

Figure 11: Examples of AFR usage levels as a percentage of energy consumption
Clinker Substitution

The largest source of GHG emissions from cement manufacturing is the chemical process associated with clinker production. This accounts for around 60 per cent of the industry’s total emissions. As limestone (CaCO$_3$) is heated to produce lime (CaO) carbon dioxide (CO$_2$) is liberated. This is a chemical reaction inherent in the production of Portland cement.

Cement is the glue that binds gravel, sand and water together to make concrete. Replacing a portion of clinker with other cementitious materials has the potential to realise significant emissions reductions within our sector - without adversely impacting on the performance of the cement. Slag, a waste product of steel manufacturing, and fly ash, arising from coal fired power generation, have cementitious properties and can be used to supplement clinker in cement. The proportion of clinker replaced with slag or fly ash is referred to as the Mineral Addition Rate.

Currently, the Australian Standard (AS 3972-2010) General purpose and blended cements limits the amount of mineral addition in Portland cement to 7.5 per cent. Recent research$^7$ demonstrates that mineral additions could be increased to 12 per cent without significantly impacting on the performance of the product.

In the US and Canada roads and buildings are regularly constructed with up to 15 per cent limestone addition without impacting performance or application. An increase to 12 per cent allowable mineral addition in the Australian Standard has the potential to reduce total cement industry emissions by around 5 per cent (around 250,000 tonnes) annually.

Energy Efficiency

Improving energy efficiency is part of the everyday business of cement manufacturing. As large users of energy, both in the form of electricity and to produce heat, Australian clinker and cement manufacturers place a high value on managing energy as efficiently as possible.

All CIF members have energy management plans in place and are continually looking for opportunities to implement energy efficiency improvements where it is economical to do so. This is core business to Australian cement manufacturers as it supports the industry’s sustainability goals.

$^7$Effect of up to 12% substitution of clinker with limestone on commercial grade concrete containing supplementary cementitious materials.
Mohammadi, South (2016)
Carbon Capture, Storage and Utilisation

Carbon capture, storage and utilisation (CCSU) is a process whereby carbon dioxide is captured and then transported to storage or for use. While the CCSU concept is complex and highly capital intensive, it is recognised as a key technology required to deliver net zero emissions from many industrial sources during this century.

Cement plants are well suited to carbon capture due to the high CO$_2$ concentration of the flue gas which is less polluted by other environmental emissions relative to other industrial sources.

Investigations are underway into possible uses for captured CO$_2$, including as a raw material for the process and/or as marketable building materials.

To date there have been few successful CCSU projects outside of the oil and gas industry – and the likely costs alone, not including the existing regulatory uncertainty, make it prohibitive at this stage.

Despite this, given that around a third of the emissions from our industry are process emissions related to the chemical transformation of limestone, CCSU is expected to play a significant role in reducing cement emissions across the globe over the longer-term.

The CIF will maintain an active engagement as the CCSU technology evolves into an economic industrial option.
Energy Use

A cement manufacturing plant requires significant amounts of energy to produce clinker, the main ingredient in cement.

Energy in the form of electricity is required to prepare the raw meal (typically limestone, clay, sand and iron ore), run the kiln and, in integrated cement plants, to grind the clinker, gypsum and other materials to produce cement in grinding mills (Figure 12).

In 2018-19 Australian integrated cement industry electrical power consumption was around 923 GWh, 1 per cent lower than in the previous year and 7 per cent lower than 2010-11.

![Figure 12: Electrical energy use in the Australian Cement Industry](Source: CIF Survey)

For integrated cement plants, energy in the form of heat is required to raise the kiln temperature to over 1,450°C required to produce clinker. This heat is predominantly generated by coal and natural gas, and to a lesser extent by diesel oil.

In total Australian cement producers used around 21 PJ of thermal energy, up 3 per cent year-on-year and down 23 per cent since 2010-11 (Figure 13). Of this 61 per cent came from coal, 21 per cent from natural gas, 3 per cent from diesel oil and other fuels. The remaining 15 per cent was derived from alternative fuels (such as wood waste, solvents, used oil, spent pot liner and carbon powders).
Energy Availability and Affordability

The secure, reliable and affordable supply of electricity is a key competitiveness concern for large users of energy and electricity such as Australian cement manufacturers.

A consistent and integrated approach to climate and energy policy across all Australian government jurisdictions will help to provide certainty and stability in the Australian electricity market.

In the current unstable market prices are increasing and supply is not always guaranteed. For example, supply disruptions, such as those experienced in South Australia in late 2016 and continuing into 2017, placed significant pressure on operations as they attempted to meet customer demands for their products.

CIF members are considering or have already implemented contingency plans to protect against market instability. Such plans typically involve a significant and unnecessary cost burden in terms of capital and other requirements, impacting on the long-term competitiveness of our operations.

A pragmatic coordinated approach to climate and energy policy at all levels of government will help to avoid price shocks and unintended impacts on Australia’s electricity system, whilst striving to achieve Australia’s climate change objectives.

Figure 13: Australian cement industry energy sources
Source: CIF Survey
Environmental Emissions

Companies engaged in the production of clinker and cement in Australia have a strong commitment to the prevention of pollution and in controlling the impacts of their activities on the environment.

As a minimum, all CIF members manage their operations in line with site-based environmental licences and approvals as well as federal and state based regulations. Licences governing Australia’s cement manufacturers typically include conditions to protect environmental values such as water, air, land, waste and the community.

CIF members are also required to report emissions under programs such as the National Pollutant Inventory and the National Greenhouse and Energy Reporting Scheme.

Particulate Emissions

Managing dust (particulate) emissions remains a strong focus for CIF members given the potential impacts on employees and the community.

CIF members reported a total of around 370 kt of particulate emissions in 2017-18, down 22 per cent year-on-year. Of these emissions approximately 88 per cent were PM\textsubscript{10} and the remainder PM\textsubscript{2.5} (Figure 13).

Dust reduction strategies utilised by CIF members include upgrading bag filters, flue gas scrubbing, dust suppressants as well as truck washing facilities.

Figure 14: Particulate emissions from CIF member companies
Source: CIF Survey
Water Conservation

Historically, water was an essential ingredient in the production of clinker in Australia, with ‘long wet’ kiln technology requiring the raw material to be mixed with water to create a slurry.

The introduction of ‘long dry’ kilns dramatically reduced the amount of water required for the process. In 2018-19 around 98 per cent of Australian clinker production was sourced from dry technology kilns.

CIF member companies used 1,742 ML of water in 2018-19 (Figure 15), which was around 15 per cent lower than in 2017-18 and 70 per cent lower than in 2010-11. The significant step change in water consumption observed in 2015-16 reflects the industry’s continued move away from wet process technology.

![Figure 15: Australian cement industry water consumption](source: CIF Survey)

Land Protection, Remediation & Rehabilitation

All CIF members seek to minimise their impact on the environment across their businesses through the effective and responsible management of mines, quarries and other land assets.

Our members actively plan and implement mine site rehabilitation strategies, as well as end-use planning and development in line with their site-based planning and approvals. This includes open and constructive engagement with regulators and the communities in which they operate.

Protecting biodiversity values within and around cement and related operations is, and will remain, a core commitment of CIF member companies.
Adelaide Brighton Refuse Derived Fuels

As the first company in Australia to take on the burning of refuse derived fuels (RDF), Adelaide Brighton Cement’s (ABC) Birkenhead plant’s initial challenge was to reengineer its kiln firing system to allow for the burning of refuse derived fuels (RDF).

ABC collaborated with a local resource recovery supplier and developed an effective process for the recovery and refining of combustible material from the mixed construction and demolition refuse stream.

A three-year development phase saw both partners working together to establish a significant supply of viable fuel.

ABC faced and overcame the challenges of receiving, storing, as well as consistently monitoring and feeding the RDF to the cement kiln at Birkenhead. All this had to be achieved while maintaining steady operations, producing quality cement and meeting regulated site environmental and work health and safety standards.

ABC worked collaboratively with the SA Environmental Protection Authority, the ABC Community Liaison Group and the local community to develop a site environmental licence to manage the use of RDF. Throughout the project lifecycle, the community was kept informed of progress – including monitoring and reporting air quality conditions related to the combustion of RDF.

As an added benefit, emissions analysis shows a significant reduction of airborne nitrous oxide emissions when RDFs are used, and the residual ash from is entirely encapsulated in the kiln product to become saleable cement.

ABC’s RDF program has resulted in a South Australian construction and demolition refuse product (that would otherwise be destined for landfill) given a second life as an alternative, supplemental fuel source.

In one year, the ABC RDF program saves the combustion of 1.2 million gigajoules (GJ) of natural gas and diverts approximately 200,000 tonnes per annum of material away from landfill. Approximately half is used as a fuel source. The balance is separated through the sorting process and used in other useful inorganic products such as metals, sands and aggregates.

Through the incorporation of refuse derived fuels a stronger and more sustainable construction and cement manufacturing sector has been built, which compares favourably with international benchmarks and is at the forefront of Australian industry best practice.
Cement Australia Energy from Waste

Cement Australia has embraced the use of High Viscosity Fuels (HVF) and Solvent Based Fuels (SBF) as supplementary materials to provide thermal energy to its cement kilns at Railton in Tasmania, and Gladstone in Queensland.

Geocycle, a wholly owned subsidiary company of Cement Australia, operates a licenced waste management facility that blends and transforms a wide range of industrial and prescribed industrial waste streams at their Dandenong Victoria facility into an alternative fuel.

This fuel is then transported to the Railton and Gladstone facilities and introduced to the kilns in conjunction with other fuel sources for the manufacture of clinker.

Wastes with a range of energy values are blended into alternative fuels. These wastes can include flammable, hazardous and otherwise difficult waste streams with limited suitable disposal options, such as spent solvents, waste fuels, paints, resins, oils and greases, waste waters, fertilisers, and agricultural chemicals.

In addition to these materials some industrial wastes are received directly by Cement Australia for use as alternative fuels. This includes spent cell liners, a waste material generated in the aluminium smelting industry, and spent catalysts from the oil refining industry.

Both of these waste materials also still maintain a calorific value useful to the process.

Since 2009, the use of alternative fuels in the cement kilns by Cement Australia has:

• Delivered over 8,800,000 Gigajoules (GJ) of energy from waste;
• Avoided the consumption of over 362,000 tonnes of coal;
• Reduced greenhouse gas emissions by approximately 117,000 tonnes CO2-equivalent; and
• Diverted approximately 128,000 tonnes of solid and 147,000 tonnes of hazardous liquid waste from landfill.

Cement Australia continues to focus on the increased use of alternative fuels and optimising the opportunities in the area of energy from waste. Australian cement kilns can play a vital role in waste recovery strategies as a major consumer of waste and by-products from other industries.
A strong and vibrant cement industry will continue to add significant value to Australia’s mineral and energy resources and is a vital contributor to the Australian economy in general.

Economically Strong

The Australian cement manufacturing sector is a critical component of Australia’s economy. Our products underpin major sectors of the economy such as residential and commercial construction, as well as major infrastructure such as bridges, roads, airports, pavements and dams.

In 2018-19 the Australian cement industry recorded a turnover of around $2.37 billion dollars, down approximately 2% over 2017-18 levels.

Our industry employs around 1,270 people directly – mostly in regional areas of Australia as well as suburban and industrial areas of our cities. Our industry underpins a further 5,000 or so jobs indirectly and many thousands more in terms of downstream concrete and aggregate production and distribution.

An economically strong cement industry is important in terms of providing long-term investment and employment stability in Australia. Being economically strong also ensures that our industry can continue to invest in social and environmental programs that benefit the communities in which they operate.

Regulatory Burden

As with other large manufacturing industries with operations across the country, our industry is subject to both State and Federal policies that, if not thoughtfully implemented, have the potential to add to the already significant regulatory burden faced by our industry.

While our industry recognises the importance of regulation in the implementation of policy, we are concerned over the potential impacts of unrestrained growth of regulation – particularly in terms of complexity, redundancy and/or duplication across jurisdictions.

The CIF supports ongoing initiatives across all Australian jurisdictions to reduce unnecessary regulation at every opportunity.
Internationally Competitive

Australia’s cement industry is highly trade exposed. Cement and clinker are easily substituted for imports due to the homogeneous nature of the product. Domestic prices are generally based on import parity.

This leaves the domestic industry little room to increase prices in response to any increase in the cost of production. Closures of cement and clinker plants over the past decade suggest that the industry is already in a very competitive international market.

The cost of doing business in Australia is increasing. This is being felt across a range of inputs but primarily in terms of energy costs – in the form of both electricity and heat for the process.

Australian manufacturing industries have historically benefited from secure supplies of competitive energy prices, including for electricity. This has allowed key industries such as cement manufacturing to invest, grow, and provide jobs in the regions in which they operate – while delivering high quality cementitious products that underpin our built environment.

These factors have helped to underpin the international competitiveness of our industry over more than three decades.

Current and future policy development – particularly in the key areas of energy and climate policy – must recognise the importance of maintaining the international competitiveness of critical industries such as cement manufacturing.

Failure to do so will disadvantage domestic clinker manufacturing in Australia and lead to an increase in imports from competing countries not subject to similar regulatory, environmental and cost constraints.
Delivering to Customers

CIF members are committed to delivering high quality cementitious products to customers in a responsible and sustainable manner.

Products manufactured and delivered by our members include General Purpose, blended cements, as well as specialty cements for unique applications. The major cement types produced by CIF members in Australia conform to the Australian cement standard (AS3972).

General Purpose (Type GP) is the most common cement type used in Australia. This cement type is renowned for its consistency and versatility, and it forms the basis on which most cement blends are made.

General Blend (Type GB) is a common mix of Type GP with various amounts of other cementitious materials such as fly ash and ground granulated blast furnace slag.

General Limestone (Type GL) is general or blended cement mixed with significantly higher proportions of limestone. While this cement type is allowed for in the standard, it is currently considered a specialty cement in Australia and only produced on demand.

Other specialty cements used in Australia include Type SL (Shrinkage Limited), Type HE (High Early Strength) and Type SR (Sulfate Resistant).
Cement is the key ingredient in concrete – one of the most used manufacturing materials in the world. The extent to which our society is reliant on cement and concrete can be seen in the built environment in which we live: from our homes and workplaces, the roads we drive on, our schools, hospitals, footpaths, bridges, airports, dams as well as water and sewage systems.

This trend is set to continue into the foreseeable future as population growth in our cities and regions increases, fuelling demand for significant investment in Australia’s infrastructure networks. All levels of government recognise this and are planning and implementing required infrastructure projects to meet these requirements.

Infrastructure Australia’s 2019 priority list, released early in 2019, identified $58 billion worth of nation building infrastructure investments in cities and regions.

Cement and concrete will continue to play a vital role in the development and construction of Australia’s critical infrastructure and contributing to the overall economic wellbeing of our nation.
Boral Berrima Cement Solid Waste Derived Fuels

Boral Cement Berrima Works has implemented an ambitious project to replace up to 30 per cent of the traditional fuel (coal) used to fire the cement kiln at Berrima with fuels derived from waste.

Solid waste derived fuels (SWDF) are repurposed materials that would have otherwise entered landfill. Their displacement provides a significant service to the local community with the added benefit of significantly reducing fuel-related greenhouse gas (GHG) emissions.

The energy requirements for a cement kiln can represent up to 40 per cent of operational costs.

It is no surprise then that in the current environment of rising energy and raw material costs Boral Cement was incentivised to seek out opportunities to lower production costs in order to secure the long-term viability at Berrima.

The use of SWDF at Berrima Cement Works has the potential to displace up to 100,000 tonnes per annum of waste material and reduce coal consumption by approximately 50,000 tonnes per annum.

During 2018-19 around 30,000 tonnes of CO₂ were saved as part of this project. This is expected to increase to 50,000 tonnes in 2019-20.

While the use of alternative fuels and raw materials (AFRs) in cement kilns is becoming increasingly common in Australia and globally, the specific type of facility implemented at the Boral Berrima Cement Works is the first of its kind in Australia.

The introduction of SWDF into the involved the construction of a facility to receive, store, feed and fire the material into the cement kiln.

The resulting facility incorporates state of the art and innovative features including a totally enclosed conveyor for the transfer of fuel to the calciner, as well
as a fully automatic grab crane material handling system.

Extensive continuous online monitoring equipment was installed in conjunction with the installation of the handling system.

Proof of Performance Trials involving stack testing and continuous emissions monitoring over an eight-month period confirmed that all emissions were within current approved limits.

As an added benefit, operational data over the first six months of the trial period indicated a 3.5 per cent reduction in nitrogen dioxide emissions – most likely due to the SWDF interacting with the burning of coal in the kiln.

As a result of this project Boral Berrima Cement Works has been established as the only licenced waste to energy facility in NSW.

Boral Berrima Cement Works will continue to monitor the introduction of SWDF into the kiln – both in terms of kiln performance and the impact on emissions – as the levels of SWDF are increased in line with the goal of replacing up to 30 per cent of primary fuel requirements.

This exciting project is on track to divert significant levels of waste from landfill while at the same time achieving significant cost savings and reducing greenhouse gas emissions – all critical elements in securing the long-term viability of the Boral Berrima Cement Works.