

after water,
concrete is
the most
consumed
material
on earth ...
cement is
the 'glue'
that holds
it together

WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT



C E M E N T **I N D U S T R Y**
F E D E R A T I O N

Cement Industry Federation

The Cement Industry Federation (CIF) is the national body representing the Australian cement industry, and comprises 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 clinker and cement production in Australia.

CIF aims to promote and sustain a world-class, internationally competitive Australian cement industry, positioned to take advantage of emerging market opportunities, and endorsed by a community licence to operate.



Why cement is important

Cement is the glue that binds aggregates together to form concrete, one of the key construction materials available today. Twice as much concrete is used in construction as all other building materials combined. The pre-mixed concrete industry consumes the greatest volumes of cement, for applications including concrete slabs and foundations for buildings, as well as for large infrastructure including roads, bridges and reservoirs.

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



Supply situation

Cement manufacturing is a domestically focused industry. Imports have historically been small compared with domestic supply and are used to bridge the gap between domestic supply and demand.

Demand for cement in Australia is just over 10.1 million tonnes of cementitious materials. Under normal circumstances when there is sufficient growth in demand, new domestic capacity would be built to replace imports.

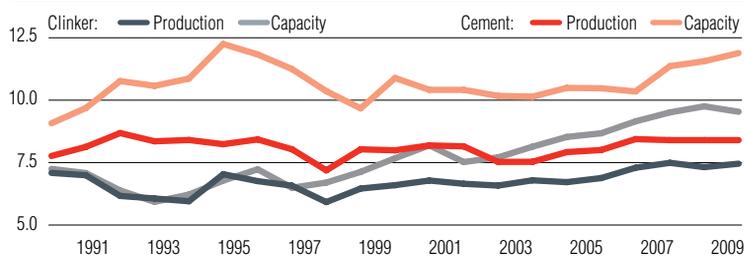
With an appropriate regulatory environment, that is internationally competitive, Australia's cement industry should continue to competitively supply domestic needs while improving environmental performance and sustainability.

Australia's environmental performance on cement manufacturing is at world's best practice on many measures.

Since 1990 per tonne of cement, the industry has achieved a 35% reduction in fuel used, 15% reduction in power used and 23% reduction in CO₂ emissions.

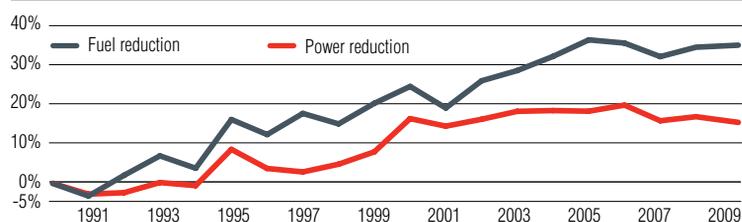
These achievements have been made through investments in best available technology, use of alternative fuels and raw materials and use of supplementary cementitious materials.

Clinker and cement capacity and production (million tonnes)

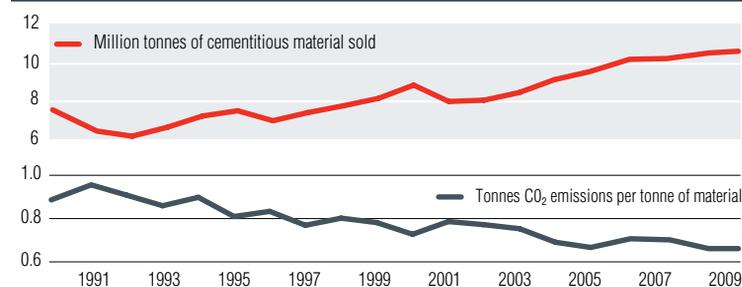


Key achievements

Fuel and power efficiency gains (% reduction per tonne of cement produced since 1990)



Cementitious material sold and CO₂ emissions



New grinding systems

A trial of a new sonic grinder has been undertaken at Cement Australia's Bulwer Island cement grinding facility. This grinding system could lead to huge gains in energy efficiency. This technology is Australian made and while the first trial was informative, further work will be needed to ensure this technology can produce cement of a suitable quality.



Challenges

Immediate

Immediate opportunities for improved environmental performance include the greater utilisation of supplementary cementitious materials or cement extenders, as well as the greater use of alternative fuels and raw materials.

It is technically possible to make further gains in these areas as the barriers to greater utilisation of cement extenders and alternative fuels and raw materials are typically regulatory.

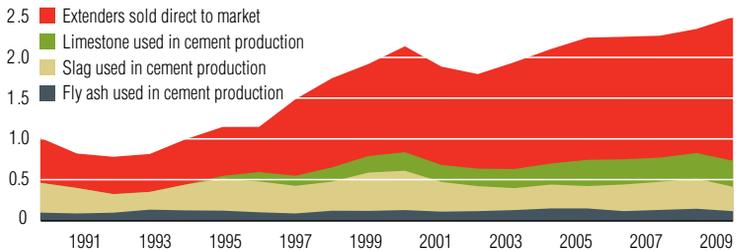
Cement extenders:

To increase the use of cement extenders, the market must be educated to accept them.

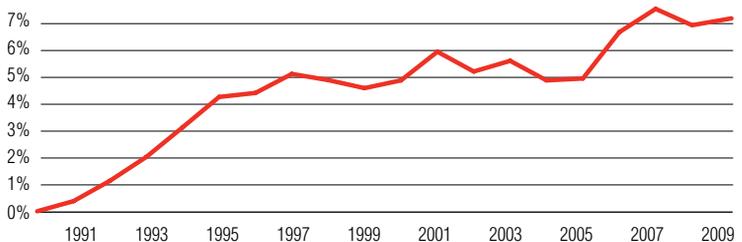
Alternative fuels and raw materials:

Effective implementation of COAG's National Waste Policy will make the utilisation of more alternative fuels possible by reducing regulatory barriers.

Extenders used in cement production and sold for concrete production (million tonnes)



Alternative fuel use as a percentage of total thermal energy use



Medium to longer term

If the Australian cement industry is to move ahead of the world on environmental performance, it must pioneer new technologies. The cogeneration of electricity with cement manufacturing, the creation of biofuel from algae and the use of energy efficient grinding techniques may provide medium-term opportunities.

Longer term technology options may include the manufacturing of new substances with cementitious qualities that do not require calcination or to safely capture and store the carbon dioxide released.

Solvent-based fuels

Geocycle Australia (a subsidiary company of Cement Australia) is working to utilise the thicker heavy sludges, currently being sent to landfill, as an alternative fuel for cement kilns and at the same time, utilise the steel drums used to transport the sludge to prevent the need to send them to landfill also.





Mercury-contaminated sewerage sludge as an alternative fuel

Sewerage sludge has the capacity to replace fossil fuel to fire a cement kiln. Melbourne Water have stored their dry sewerage sludge for many years as they have been unable to use it as fertiliser due to the presence of mercury present in the sludge as a result of trade waste having been allowed into the Melbourne sewerage system over many years.

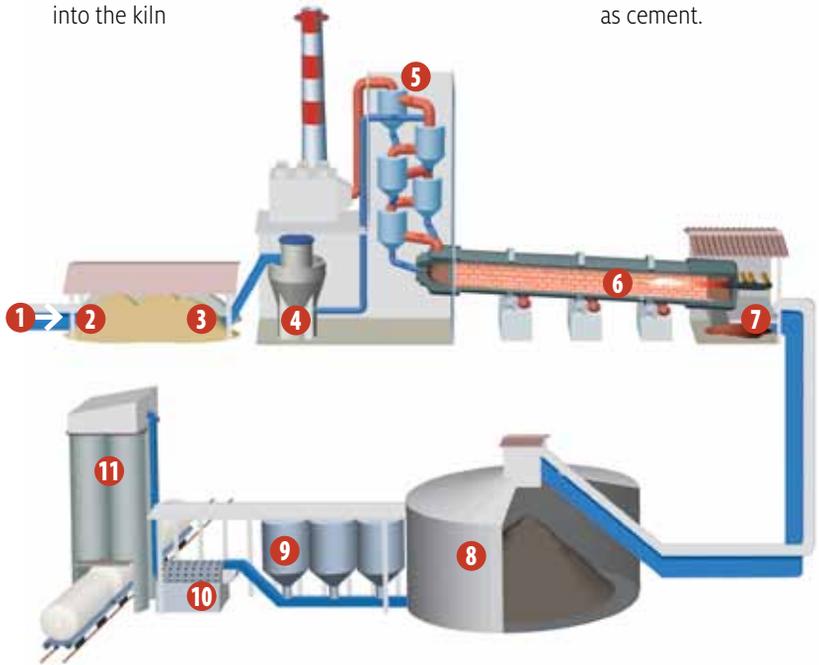
An Asia Pacific Partnership project may lead to the adoption of technology that will remove mercury from cement kiln emissions to make the use of the sewerage sludge as a kiln fuel possible.

How cement is made

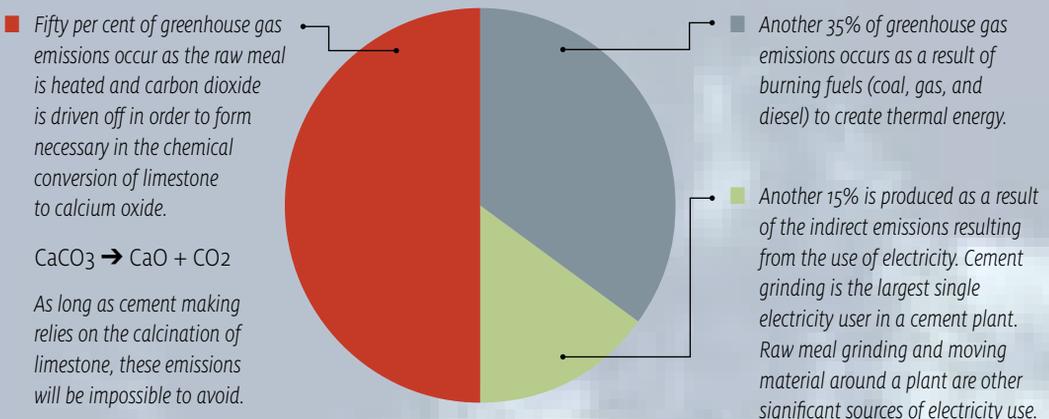
Cement is a man-made powder that, when mixed with water and aggregates, produces concrete. The cement making process can be divided into three basic steps:

- raw materials are mined or quarried and ground into a raw meal ready to feed into the kiln
- clinker is made in the kiln at temperatures of 1450°C
- clinker is ground with other minerals to produce the powder we know as cement.

- 1 Raw material extraction
- 2 Crushing
- 3 Prehomogenization
- 4 Grinding
- 5 Preheating
- 6 Rotary kiln
- 7 Cooler
- 8 Clinker storage
- 9 Additions
- 10 Cement grindings
- 11 Cement silo



Source of greenhouse gas emissions in a cement plant



Cement facts

- Cement is the glue that binds aggregates together to form concrete, one of the key construction materials available today.
- By weight, concrete is the most consumed product on earth after water.
- Prior to the 2008 global financial crisis, Australian Demand for cement was just over 10.1 million tonnes of cementitious materials.
- Growth in demand for cement is closely linked to Australia's economic growth
- Since 1990, per tonne of cement, the industry has achieved a 35% reduction in fuel used, 15% reduction in power used and 23% reduction in CO₂ emissions.
- To make further gains on environmental performance Australia's immediate opportunities include the greater utilisation of cement extenders and alternative fuels
- Cement production is capital intensive
- Fixed costs are a high percentage of total costs
- Under poorly designed climate policies, cement industry is at risk of becoming a source of carbon leakage as Australian demand could easily be met by kiln capacity in the Asia Pacific region.
- Over the last 15 years domestic cement prices have followed the import parity price.
- The cement industry is a trade exposed emissions intensive industry