CEMENT INDUSTRY FEDERATION

26 March 2009

John Hawkins
Committee Secretary
Senate Select Committee on Climate Policy
PO Box 6100
Parliament House
CANBERRA ACT 2600

Dear John,

CIF SUBMISSION: Senate Select Committee on Climate Policy

The Cement Industry Federation ("the CIF") welcomes the opportunity to submit comments to the Senate Select Committee on Climate Policy.

The Cement Industry Federation is the national body representing the Australian cement industry, and comprises the three major Australian cement producers - Adelaide Brighton Ltd, Blue Circle Southern Cement Ltd and Cement Australia Pty Ltd. Together these companies account for 100 per cent of integrated clinker and cement supplies in Australia.

The 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.

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1 Executive Summary

The CIF opposes the current design of the Governments CPRS with particular emphasis on the proposed designs inability to protect emissions-intensive trade-exposed (EITE) industries such as the Australian cement industry. The proposed EITE assistance to the Australian cement industry will diminish the competitiveness of the industry leading to the premature closure of production facilities and deter new investment which contradicts the commitment made by the Government in the 2007 election campaign to not disadvantage EITE industries.

The CPRS White Paper claims to recognise the need to shield emissions-intensive trade-exposed (EITE) industries unable to pass the increased costs associated with the ETS to their customers, **yet the details tell another story**. The CIF opposes the proposed assistance rate of 90 per cent of emissions for new and existing operations for *clinker manufacturing* only. We believe EITE assistance should cover the entire integrated cement manufacturing process as each activity does not occur in isolation. Whilst it will take some adjustment the Australian Cement Industry believes it can remain competitive with a 90 per cent free allocation of permits for the entire cement manufacturing process.

Additionally the proposed decay of assistance rate will lead to substantial competitiveness issues and carbon leakage. The decay over time will deter new investment in Australia and lead to the progressive shutdown of existing operations.

The CIF encourages the Government to actively seek opportunities to develop and implement a truly global emissions trading. The Australian cement industry is not asking for a free kick, we want to compete on a level playing field with our international competitors.

2 Background to Cement

2.1 The Importance of Cement

The cement industry is critical to many industries. It is the 'glue' that binds our buildings and infrastructure, including roads, rail, airports, bridges and ports.

Cement is a vital commodity for the Australian economy, not only as a critical input for Australia's construction industry, but increasingly in resource recovery and reuse innovation – in both cases providing significant economic and social benefits. Competitively priced supplies of cement are essential to Australia's continuing economic growth. Hence security of supply should be a goal supported by all levels of Government.

2.2 Cement and Climate Change

The Australian cement industry recognises the threat that climate change poses to our natural environment as identified by the scientific world. We have been working diligently on this challenge for well over a decade and have developed and maintained a verifiable emissions database extending back to 1990. Since that time the industry has maintained carbon dioxide emissions at 106 per cent of 1990 levels while increasing production by 39 per cent and reduced the carbon intensity of its product by 23 per cent per tonne (figure 1).

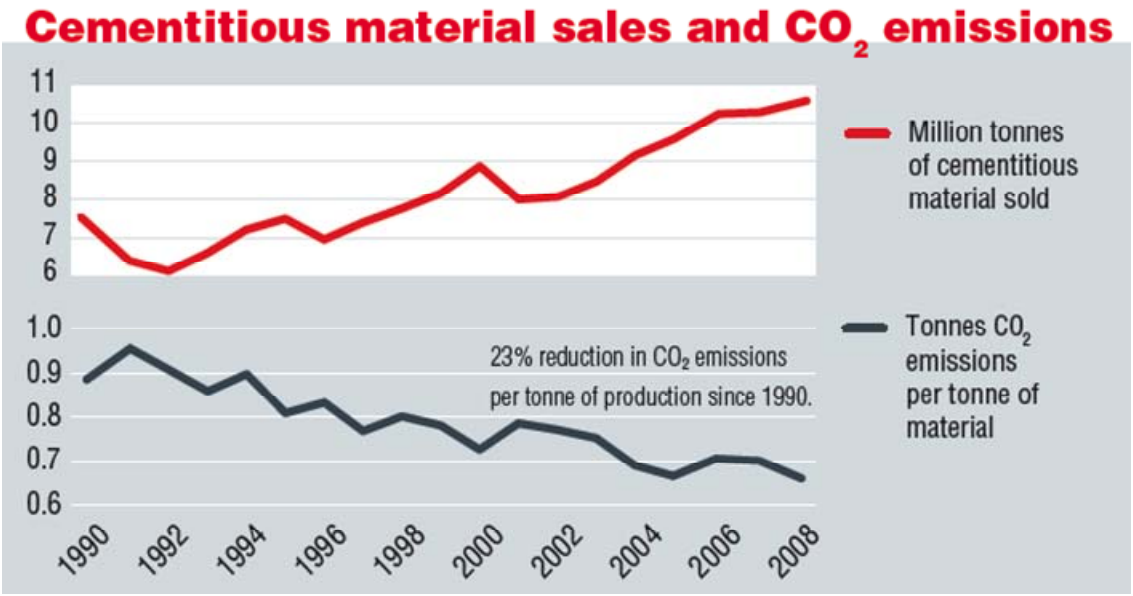


Figure 1 – Cementitious material Sales and CO_2 emissions

The cement industry has consciously engaged in striving for improvement through being a leader in the uptake of technology to maximise energy efficiency, increasing the use of by-products of other industries, reducing greenhouse emissions through reduced dependence on fossil fuels and in working in concert with the broader community.

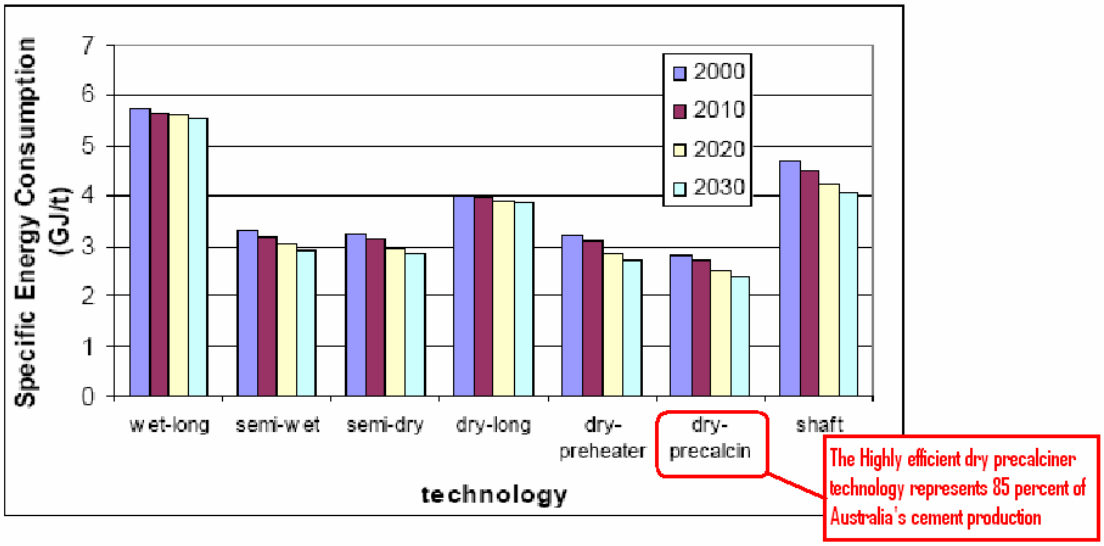


Figure 2 – Average world specific energy consumption by kiln technology

From a global context the Australian industry, while small in size, has a high uptake of best technology (see figure 2) and has remained price-competitive with our closest neighbours. Retaining this competitive position with our Asian neighbours remains a critical area of importance and is potentially the most difficult challenge for the development of any national emissions scheme. Appendix C provides a description of the various kiln technologies used throughout the world. The highly efficient dry precalciner technology represents 85 per cent of Australia's cement production.

For the last twenty years the Australian cement industry has continued to seek out new opportunities to reduce carbon dioxide emissions through more energy efficient technology. It is important to note **there is no new technology on the horizon that will enable the industry to significantly reduce its current emissions intensity for clinker**. However opportunities are present for further reductions in the emissions intensity of cement, such as the further addition of supplementary cementitious materials (SCMs).

3 Carbon Pollution Reduction Scheme and White Paper

The CIF response to the White Paper is focussed primarily around chapter twelve; *Assistance to emissions-intensive trade-exposed industries*. Whilst the CPRS White Paper claims to recognise the need to shield emissions intensive trade exposed (EITE) industries unable to pass the increased costs associated with the ETS to their customers, **the details tell another story**.

3.1 Objectives of the CPRS and White Paper

One of the key objectives of the CPRS White Paper is for Australia to meet its emissions reduction targets in a flexible and cost effective manner. Whilst this is an important objective, the Government recognises, acting alone, Australia cannot solve the climate change problem. The need to reduce overall global emissions is the primary objective and an Australian designed CPRS that drives existing industry off shore and the resultant importation of these same goods into Australia from facilities with a higher emissions intensity defeats the purpose of the scheme. The CIF strongly urges the Government to ensure domestic policy on climate change does not result in a net increase in global emissions.

The Government made the following commitments during the 2007 election:
"*A Rudd Labor Government will*

- *Ensure that Australia's international competitiveness is not compromised by the introduction of emissions trading*
- *Consult with industry about the potential impact of emissions trading on their operations to ensure they are not disadvantaged*
- *Establish specific mechanisms to ensure that Australian operations of emissions intensive trade exposed firms are not disadvantaged by emissions trading.*"

The CIF supports the Prime Ministers position and will work with the Government to contribute to the same objective.

3.2 Key Issues for Cement

The CIF is comfortable with the following design elements in the CPRS White Paper:

- Assistance provided to offset competitive loss of EITE industries, in the absence of a truly global scheme.
- The allocation of assistance for direct emissions of new and existing EITE entities being calculated on the basis of an Australian historical industry average emissions intensity baseline for each EITE sector over the period 2006-07 to 2007-08.
- Allocation to new EITE investment should be conditional of employment of international best practice.

However the CIF opposes the following design elements in the CPRS White Paper:

- The disaggregation of EITE activities. We consider the cement manufacturing process as an integrated process as **each activity does not occur in isolation**. The disaggregation of EITE activities will fundamentally thwart the stated shielding policy intent for EITE industries. The CIF opposes a clawback of the particular activities which make up an integrated manufacturing process defined as EITE.
- All EITE activities (excluding agriculture) should be limited to 25 per cent of available permits. The current level of emissions by EITE industries exceeds the 25 per cent allocation by the Government which indicates the Government is attempting to reduce the assistance rate to eligible EITE to enable all EITE industries to fit into the 25 per cent allocation pool by disaggregating activities. The CIF supports an assistance policy where all industries that meet the criteria set out for EITE status, receive the allotment regardless of the overall percentage of the national emissions.
- The decay in permit allocation for EITE industries over time. The decay of assistance rate will result in no new investment and gradual run down of existing plants forcing industry off-shore with no global climate change advantage.

3.3 Principles guiding the development of EITE industry assistance

The CPRS White Paper states *"the ultimate objective of the scheme is to contribute to reductions in global emissions"* and *"if an emission-intensive entity relocates to another jurisdiction and uses a more emissions-intensive production technology, the move would increase global emissions and result in carbon leakage"*, whilst the CIF supports these key rationales for providing assistance to emissions-intensive trade-exposed

industries this is not apparent in the policies described within chapter twelve of the White Paper. The proposed assistance policy for both new and existing EITE industries does not encourage those industries to continue to produce in Australia following the introduction of the scheme. As outlined in Appendix A, the Australian cement industry has an emission intensity second only to Japan in the Asia-Pacific region (see page 24), given the proposed assistance policy for EITE industries, carbon leakage will occur if clinker that could be manufactured in Australia is produced offshore. This does not fit with the ultimate objective of the scheme to contribute to reductions in global emissions.

3.4 Employment Impacts

A well designed ETS must have protection for EITE industries until a truly global scheme is implemented. A permit not allocated to an EITE firm shifts the disproportionate burden to the EITE workers and shareholders, who are also households. The closure of EITE industries not only affects the jobs of the workers employed within the industry but also the indirect jobs downstream of the industry. The Australian cement industry employs a diverse range of technically skilled workers in regional areas such as Berrima, Maldon, Kandos, Angaston and Railton. A closure of capacity would have dire consequences for local employment. Indirect employment generated by the Australian cement industry is about four times the direct employment bringing substantial economic benefits to local communities as well as the broader economy (refer to Appendix A, page 23).

3.5 Identifying recipients of EITE assistance

3.5.1 Assessing emissions intensity

The cement industry sector stands out as extremely emissions-intensive compared to other sectors regardless of the denominator, therefore the CIF is comfortable with the adoption of either option, emissions per unit of revenue or value added, as a measure for emissions intensity.

3.5.2 Assessing Trade Exposure

The cement industry is an EITE industry unable to pass the increased costs associated with the ETS to our customers. Australian cement prices are constrained by import parity pricing (IPP) and domestic prices historically follow IPP over the long term. Appendix A details the case for the Australian Cement Industry as an EITE industry.

The problem of any ETS that is not global in coverage and the smaller the global sub-group participating in such a regime, the greater the competitiveness issue for the trade exposed industries.

3.6 Initial size and distribution of the EITE assistance policy

The CIF strongly disagrees with the assumption all EITE activities (excluding agriculture) should be limited to 25 per cent of available permits. The current level of emissions by EITE industries exceeds the 25 per cent allocation by the Government which indicates the Government is attempting to reduce the assistance rate to eligible EITE to enable all EITE industries to fit into the 25 per cent allocation pool. The CIF supports an assistance policy where all industries that meet the criteria set out for EITE status, receive the allotment regardless of the overall percentage of the national emissions.

Additionally, the CIF is disappointed the Government has chosen to separate the clinker manufacturing and cement grinding process and only provide assistance for the clinker manufacturing activity. The in-direct emissions from the cement grinding activity accounts for approximately 7 per cent of the overall cement manufacturing process. As the proposed 90 per cent assistance rate for EITE activities (with emissions intensities above 2,000 tonnes CO2 –e per million dollars of revenue) only covers the clinker manufacturing activity, the cement industry will receive an allocation of approximately 83 per cent of the permits required for the overall cement manufacturing process. The CPRS White Paper is proposing the cement industry absorb approximately 17 per cent of its total emissions. Alarmingly, the Department of Climate Change has recently released a draft activity definition of clinker production, which excludes the extraction, crushing and blending of the clinker raw materials. This further claw back of activities will result in the cement industry receiving an allocation of approximately 80 per cent of the permits required for the overall cement manufacturing process. This will obviously have a significant impact on the profitability of the sector which is trade exposed.

Figure 1 clearly displays the cement industry has explored and implemented new production technologies over the last 20 years and has achieved an enviable 23 per cent CO_2 emissions reduction per ton of cementitious product since 1990. The Government is asking the cement industry to achieve further abatement that is impossible to achieve. Again this contradicts the objective of the Prime Ministers 2007 election campaign not to disadvantage EITE industries.

3.7 Calculating assistance for EITE activities

It is our strong belief that the emissions trading scheme needs to incorporate some form of performance measure to guide allocation. The CIF is comfortable with the allocation of assistance for direct emissions of new and existing EITE entities being calculated on the basis of an Australian historical industry average emissions intensity baseline for each EITE sector over the period 2006-07 to 2007-08.

Cement manufacturing is an integrated process involving the recovery and blending of minerals (calcite, alumina, ferric oxide and silica) to achieve the correct chemical mix that enables the desired quality and consistency of cement. Appendix B includes descriptions of the two activities involved in cement production. The CIF considers the clinker manufacturing process as an integrated process as each activity does not occur in isolation. If cement manufacturing relocates offshore as a result of poor shielding policy then the limestone mineral blending will also move offshore. This is not the case with other mining products such as coal and bauxite, as these products are valuable in their own right and will be exported should manufacturing not take place in Australia.

The CIF believes the aggregation of particular activities which make up an integrated manufacturing process, such as cement manufacturing, is consistent with the intent of a shielding policy for EITE industries. Any disaggregation of EITE activities contradicts the overall objective of the Prime Minister and CPRS to not disadvantage EITE industries.

The Canadian approach to calculating assistance for EITE activities

The CIF notes the Canadian ETS (Regulatory Framework for Air Emissions) does not include fixed process emissions. The Canadian ETS emissions-intensity reduction calculation applies only to combustion and non-fixed process emissions. Fixed process emissions that are tied to production and for which there is no alternative technology that will reduce them. The only way to reduce these emissions is to reduce production. The calcination in cement and lime production is listed as an example of fixed process emissions. The Canadian framework states "*there is no known techniques or practices to avoid the release of carbon dioxide when limestone is calcined*". The CIF would strongly urge the Government to duplicate this approach taken by Canada and provide 100 per cent assistance rate for fixed process emissions as there is no known techniques or practices to avoid the release of carbon dioxide when limestone is

calcined. The CIF's supports the adoption of 100 per cent assistance rate for fixed process emissions coupled with a 90 per cent assistance rate for thermal and indirect emissions. The CIF acknowledges that processes that are currently considered fixed may not be considered fixed in the future if technologies or processes are developed that could reduce or capture and store emissions.

3.8 Assistance to EITE entities over time

The CIF disagrees with the Governments position of reducing the EITE assistance rate over time with the intent that the share of assistance provided to the EITE sector does not increase significantly over time.

Critical for the Australian cement industry is the issue of maintaining competitiveness in an import-competing environment whilst acknowledging that Australia imports about 20% of product to meet the current supply / demand balance. Whilst we believe that providing EITE industries with 90 per cent permit allocation is somewhat equitable for all industries we urge the Government to explore other options rather than reducing the assistance rate over time.

The CIF's preferred option is a fixed level of assistance per unit of output over time. If an industry is recognised as an EITE in 2010, then it should remain recognised as a EITE industry in 2020, with a fixed assistance rate until such time that **a global scheme is implemented**.

As stated in the White Paper the ultimate objective of the scheme is to contribute to reductions in global emissions. If an emission-intensive entity relocates to another jurisdiction and uses a more emissions-intensive production technology, the move would increase global emissions and result in **'carbon leakage'**. By reducing the assistance rate for EITE industries over time, the Government is forcing these industries to commence unrealistic abatement opportunities or reduce returns on business hence lowering the expected returns of their shareholders. As outlined in the introduction, the Australian cement industry has already achieved significant CO_2 abatement over the last 20 years. The White Paper is asking the industry to do something it has already achieved as the industry is already producing at worlds best practice (WBP) and has limited opportunity to gain further significant abatement savings, therefore the proposed reduction in assistance rate will have a significant impact on the profitability of the sector.

An important characteristic for the Australian cement industry is that our competitors, almost without exception, are countries in the developing world where the prospect of GHG emissions penalties being imposed is very distant. With respect to GHG emissions and given the relative carbon efficiency of the Australian industry, there is little or no global environmental benefit in locating these industries in Asia or elsewhere, in preference to Australia. This is the 'carbon leakage' problem which together with the added emissions arising from transport defeats the overall objective of reducing global emissions. Australia might meet its emissions reduction target but the world won't.

There is no quick fix to emissions reduction and the decay of the assistance rate over time is not the answer. This decay does not promote the expected returns for new investment in the Australian cement industry. The decay in assistance rate will also have a dramatic affect on the existing assets. Depending on the trajectory rate we will see an ultimate shutdown of the cement industry over the coming years with a tendency to run down the industry. Domestic manufacturers will be forced to import clinker from countries with a higher CO_2 intensity. This will result in the loss of jobs in regional Australia impacting the local communities. Again this contradicts the objective of the Prime Ministers 2007 election campaign not to disadvantage EITE industries.

3.9 Phase out of EITE industry assistance

The CIF supports the Governments preferred position to phase out and withdraw assistance to EITE industries in the event of a broadly comparable carbon constraint is introduced in key competitor economies.

3.10 Other CPRS White Paper Concerns

Unfortunately, the current media attention around emissions trading is feeding the perception that an emissions trading scheme is the sole solution. An ETS clearly has a proper place but will only ever be one component of an effective national climate change strategy. From an industry position, we believe that an effective climate change strategy should incorporate mechanisms focused on addressing the impediments to developing technology solutions.

The CIF believes the CPRS White Paper has ignored the importance of technology solutions such as international technology partnerships and research, development and demonstration (RD&D) support.

The CIF supports the promotion of international technology partnerships to facilitate operational excellence, technology adoption, development and sharing, and workforce skills development (e.g. the Asia Pacific Partnership for Clean Development and Climate (APP) within which Australia has a creditable standing). The CIF believes Government should encourage driving the RD&D of emerging technologies (e.g. carbon capture through geo- or bio-sequestration, improved waste heat recovery) that have the potential to provide the next step-change process improvements.

3.11 Legislation

The CIF is a member of the Australian Industry Greenhouse Network (AIGN) and supports the comments in their submission to the Senate Standing Committee on Economics Inquiry into the exposure draft of the legislation to implement the CPRS.

The CIF finds the task of responding to the legislation in any substantive way very difficult without the presence of the activity definitions located in the regulation. The CIF reserves its right to comment on the design of the proposed assistance to EITE industries when the regulations are released.

4 Cement Industry Preferred Position

The CIF supports:

- The commitments made by the Rudd Labor Government during the 2007 election to:
    - Ensure that Australia's international competitiveness is not compromised by the introduction of emissions trading
    - Consult with industry about the potential impact of emissions trading on their operations to ensure they are not disadvantaged
    - Establish specific mechanisms to ensure that Australian operations of emissions intensive trade exposed firms are not disadvantaged by emissions trading.
- A national ETS that balances economic, environment and equity objectives.
- Assistance provided to offset competitive loss of EITE industries, in the absence of a truly global scheme. Ensure no competitive disadvantage to existing operations and proposed new investment.
- A fixed level of EITE assistance per unit of output over time.
- The allocation of assistance for direct emissions of new and existing EITE entities being calculated on the basis of an Australian historical industry average emissions intensity baseline for each EITE sector over the period 2006-07 to 2007-08.
- The Government to duplicate the approach taken by Canada and provide 100 per cent assistance rate for fixed process emissions.
- Allocation to new EITE investment should be conditional of employment of international best practice.
- The Governments position to phase out and withdraw assistance to EITE industries in the event of a broadly comparable carbon constraint is introduced in key competitor economies.

The CIF opposes:

- The disaggregation of EITE activities. We consider the cement manufacturing process as an integrated process as **each activity does not occur in isolation**. The disaggregation of EITE activities will fundamentally thwart the stated shielding policy intent for EITE industries. The CIF opposes a clawback of the particular activities which make up an integrated manufacturing process defined as EITE.

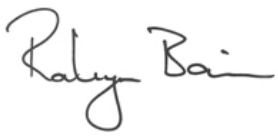
- All EITE activities (excluding agriculture) should be limited to 25 per cent of available permits. The current level of emissions by EITE industries exceeds the 25 per cent allocation by the Government which indicates the Government is attempting to reduce the assistance rate to eligible EITE to enable all EITE industries to fit into the 25 per cent allocation pool by disaggregating activities. The CIF supports an assistance policy where all industries that meet the criteria set out for EITE status, receive the allotment regardless of the overall percentage of the national emissions.
- The decay in permit allocation for EITE industries over time. The decay of assistance rate will result in no new investment and gradual run down of existing plants forcing industry off-shore with no global climate change advantage. For example, assuming an initial permit price of $25 and the cement industry receives 90 per cent permit allocation covering the entire cement manufacturing process, in 2010 the initial cost of the scheme amounts to $18 million. By 2020, the 1.3 per cent decay in permit allocation increases the cost of the scheme to $46 million. However if the disaggregation of EITE activities outlined by the Department of Climate Change is accepted, the EITE permit allocation covers only 80 per cent of the overall cement manufacturing process resulting in a cost of $31 million in 2010 and $59 million in 2020. This will obviously have a significant impact on the profitability of the sector which is trade exposed.

The Australian cement industry recognises the threat that climate change poses to our natural environment. We have been working diligently on this challenge for well over a decade and achieved, by voluntary measures, reductions in the carbon intensity of our product of 23 per cent per tonne.

The Australian cement industry can only remain competitive if the assistance rate for EITE industries remains constant until a global scheme is implemented. The decay of the assistance rate will diminish the competitiveness of the Australian cement industry leading to the premature closure of production facilities and deter new investment which contradicts the commitment made by the Government in the 2007 election campaign to not disadvantage EITE industries.

A decay in the assistance rate over time will make cement produced in Australia uncompetitive compared to imported cement. If this leads to lower output from, or even the closure of Australian cement plants, offshore plants would increase production – hence carbon leakage. Australia would more easily meet its Kyoto obligation, but global emissions would not change – hardly the actions of a responsible global citizen. Furthermore, an industry once lost to Australia might never be re-established, even if at some point in the future most countries impose a price on emissions.

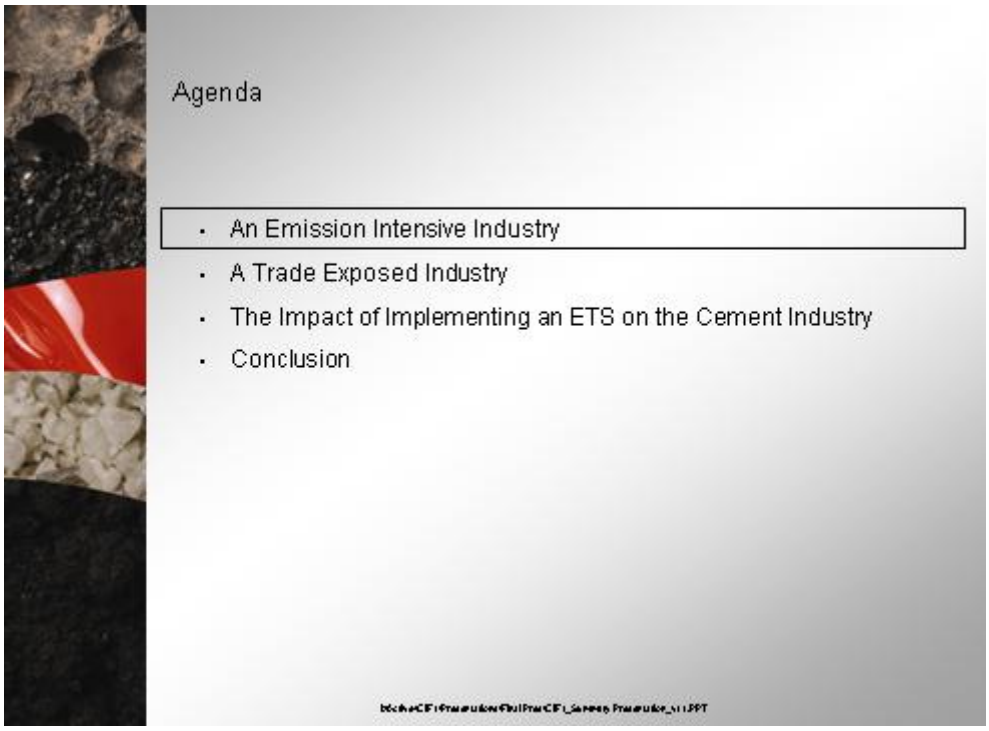
We look forward to our further consultations on this matter.



Robyn Bain
Chief Executive

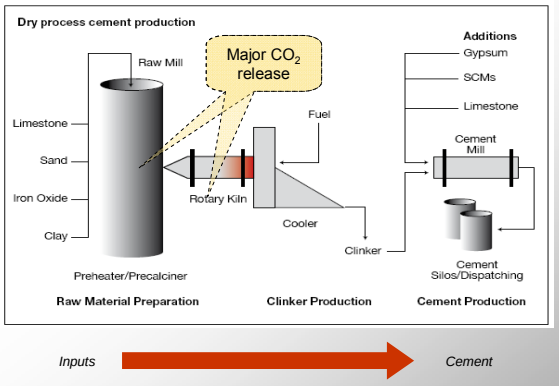
Appendices

Appendix A: Case for Emissions Intensive Trade Exposed Status complied by LEK Consulting



Cement is produced in a high temperature chemical reaction where limestone is calcined into clinker. Carbon dioxide (CO2) is emitted as a product of the reaction, through the combustion of fuels, and indirectly through electricity consumption

Cement Manufacturing Process



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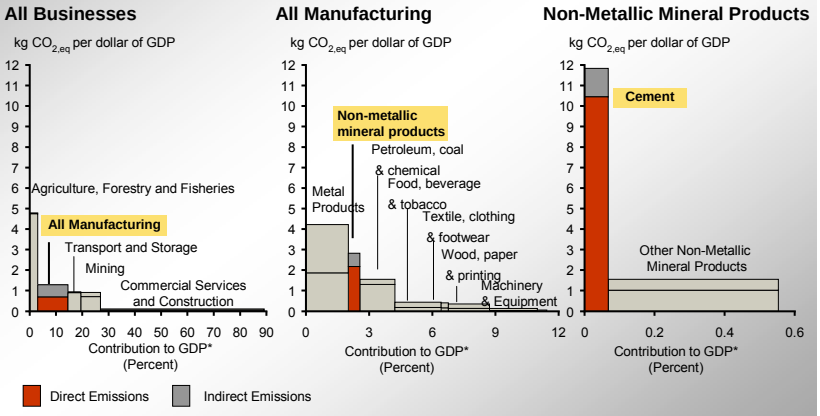
The cement industry is one of the most emission intensive sectors in Australia

GHG Emissions Intensity: $CO_{2,eq}$ Emissions Per Contribution to GDP Across Sectors (2005)



Note: *Based on contribution to GDP at basic prices (does not include taxes and subsidies). The contribution by business is less than 100% as 'Dwellings owned by persons' contributed ~8.5%
Source: ABS National Accounts and Manufacturing Industry in Australia, Australian Greenhouse Office Emissions Information System, CIF, L.E.K. Analysis

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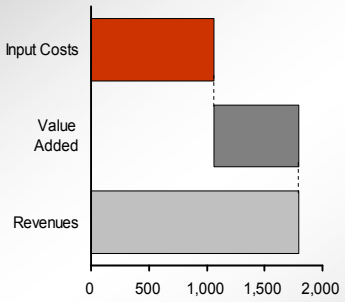
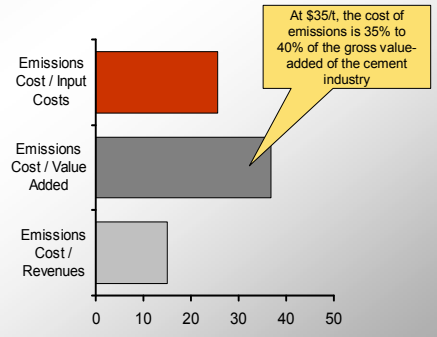
A carbon cost would have a material impact on the cement industry: the ratio of CO2 emission costs relative to its contribution to GDP is approximately 35%-40%**

Industry Measures of Value (FY2007)



Ratios of CO_2 Emission Costs* to Different Measures of Value (FY2007)



Note: * Assuming a cost of $35/t CO2; includes CO2 direct emissions and power indirect emissions (no other GHGs)
Source: CIF Industry Survey, L.E.K. Analysis

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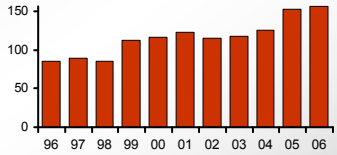
Agenda

- An Emission Intensive Industry
- A Trade Exposed Industry
- The Impact of Implementing an ETS on the Cement Industry
- Conclusion

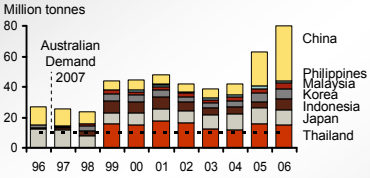
Large volumes of cement are internationally traded, and imported to Australia

Global exports of cement were close to 160Mt worldwide in 2006 and increasing. This is equivalent to 16 times the total Australian demand

Global Exports of Cement* (1996 – 2006)



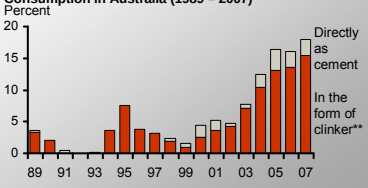
Volume of Clinker and Cement Exported from the Top 7 Asia Pacific Countries versus Australian Cement Demand (1996-2006)



More than 80Mt of cement was exported from Asia-Pacific countries in 2007. This is now 8 times the Australian demand. China is the largest exporter

Australia imports c. 18% of total consumption. Imports have grown by 10% p.a. over the last 15 years.

Cement Equivalent Imports as a Percentage of Consumption in Australia (1989 – 2007)



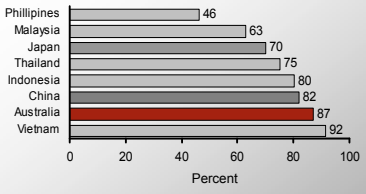
Note: *Includes clinker; **Clinker volumes are shown as the amount of cement that would be produced from the imported clinker
Source: UNComtrade, Freedonia Report; Global Cement Report; CIF; ABS; L.E.K. Analysis

There is a significant threat of "carbon leakage" as Australian demand could be easily met by the kiln capacity available in the Asia Pacific region

Kiln Capacity in Asia Pacific (1995 – 2010F)

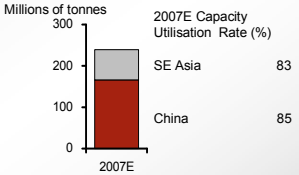
Existing cement kiln capacity in SE-Asia and China is ~2,100Mt . An additional 550Mt of capacity is planned by 2010. Capacity equivalent to Australian kiln capacity is being added every 2 to 3 weeks in Asia Pacific

Cement Kiln Utilisation Rates (2005E-2006E)



Estimated Kiln utilisation rates in Asia Pacific vary between 50% and 90%

Excess Cement Capacity* (2007E)



Excess capacity* in South East Asia and China was estimated to be more than 20 times Australian demand in 2007

Note: *Assumes the maximum reachable utilisation rate is 95%
Source: USGS; CIF; BNP Exane Paribas; Global Cement Report; Credit Suisse 30/04/2008

It is unlikely that imported clinker or cement would incur any costs for its carbon emissions as, with the exception of Japan, the major Asia Pacific cement producers are not currently considering carbon pricing schemes

Existing and Proposed Asia-Pacific Carbon Pricing Schemes

	Do cement companies currently face a cost on carbon?	Are cement companies likely to face a cost on carbon in the near-future?
China	×	×
Japan	× *Has a voluntary emissions trading scheme. However, no cement companies participate**	? *Compulsory trading schemes and caps on GHG emissions are being looked into but no planned date for introduction has been stated*
Indonesia	×	×
Thailand	×	×
Malaysia & Vietnam	×	×

Note: *Based on breakdown of companies participating in scheme for phase one and two
Source: UNFCC, OECD Emissions Trading: Trends and Prospects, World Bank, Institute of Global Environmental Strategies, Japanese Ministry of the Environment

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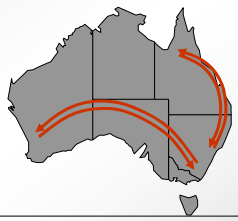
There are limited barriers to potential importers in the Australian cement market

Cement is a commodity product

- Product types and specifications are similar worldwide
  - general purpose cement (Portland Cement) and its flyash and slag blends make up two-thirds of the cementitious products sold in Australia in 2007
- Furthermore, manufacturers engage in product swaps to avoid the transport cost

Example of Swaps Between Producers



Imported product can and does reach into the Australian market

- Cement importers have access to cement users
  - unintegrated premix concrete producers represent 1/3 of concrete production
  - few customers in other sectors (hardware, concrete products, construction companies…) are integrated with cement manufacturers
- A clinker importer would have ready access to customers
  - eg BGC have a market share of 30% in WA
  - Wagners is currently setting up a grinding facility in Brisbane; capital costs are relatively low
- Imports are delivered close to end-using markets as the majority of cement consumers are located near major ports on the coast.
  - 85% of Australia's population lives within 50 km of the coast

Source: CIF Industry Survey 2007, Industry Interviews; L.E.K. Research, IBIS World

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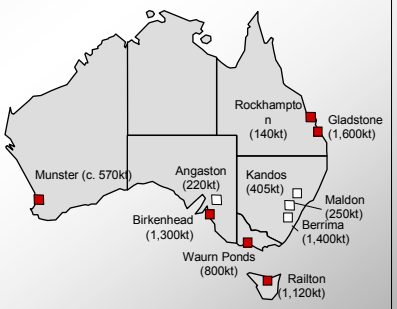
Significant volumes of foreign clinker could be substituted into Australia at short notice

There is significant port infrastructure available for cement and clinker imports

- The existing port facilities owned by Australian cement companies could currently import up to 5.9 Mt of bulk cement and clinker
- Over 2-3 years, this capacity could be increased significantly
- Bulwer Island, Townsville, Port Melbourne and Port Kembla (for Sydney) facilities have the capability to install more silos which would significantly increase their throughput capacity

Existing supply chains could immediately replace 2 / 3 of Australian clinker manufacturing with imported clinker or cement



Legend

- Integrated facility immediately substitutable by imports
- Integrated facility not immediately substitutable by imports

Note: * Capacity for clinker (e.g. kiln capacity)
Source: CIF (Technology Model), Courier Mail, Sunstate Website, ABS

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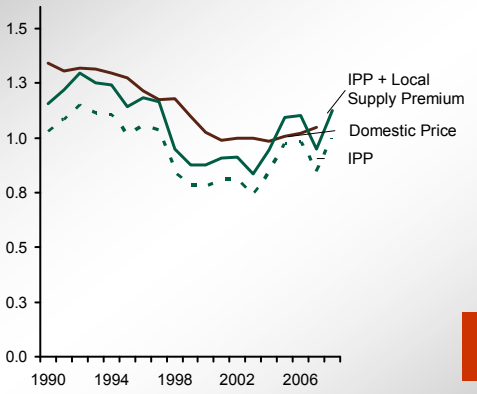
Over the last 15 years, domestic prices have followed the Import Price Parity

Import Price Parity and Domestic Cement Prices* (1990 – 2008e)

Index (AUD 2008e IPP = 1)



- Whilst domestic prices follow IPP over the long term, short term movements in IPP do not translate into domestic price changes for a number of reasons
  - domestic prices are only set approximately every six months based on the expectations of what IPP will do
  - cement is not traded on an exchange. Therefore there is a lack of transparency on prices, and a low liquidity (in comparison to the oil market for instance)
  - some sharp variations in the IPP are not expected to last, notably due to the volatility of freight rates and of AUD / US exchange rate

Domestic cement producers can not pass the carbon costs onto customers

Note: *Real 2007 prices
Source: ABL, Boral, Cement Australia, L.E.K Analysis

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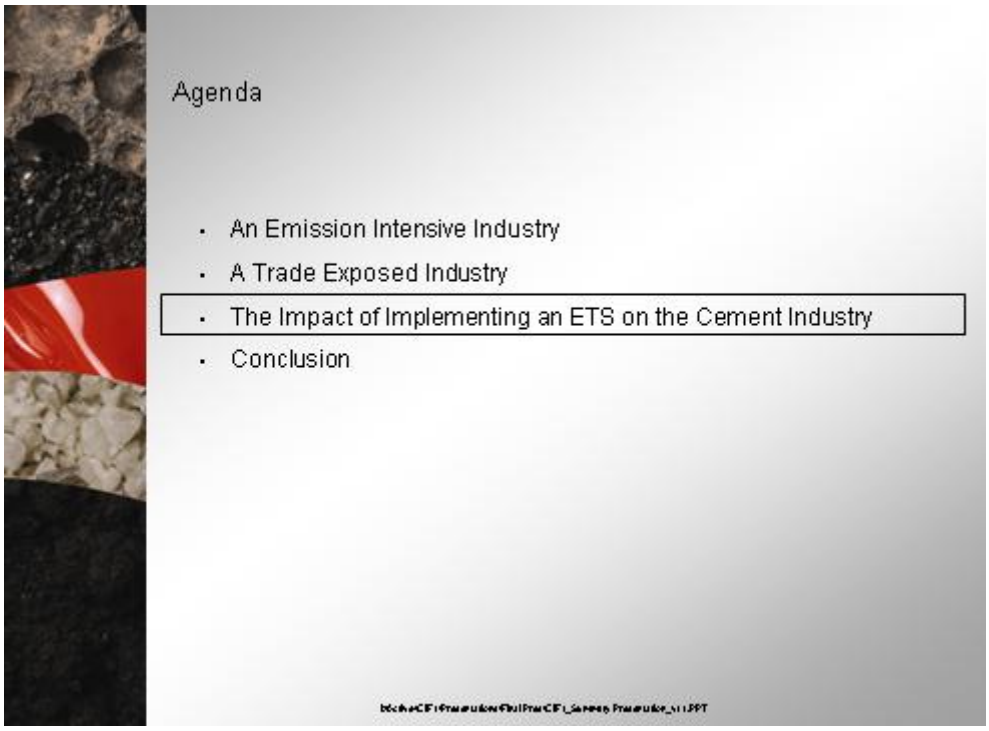
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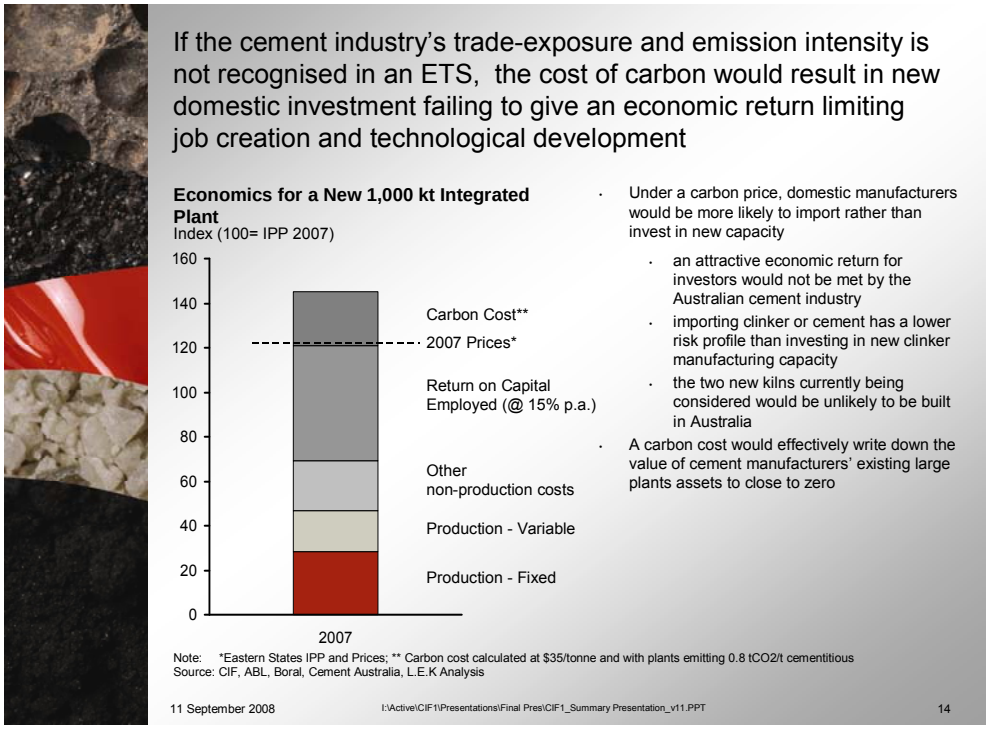
If the cement industry's trade-exposure and emission intensity is not recognised in an ETS, the cost of carbon would result in new domestic investment failing to give an economic return limiting job creation and technological development
Economics for a New 1,000 kt Integrated Plant
Index (100= IPP 2007)
160
140
120
100
80
60
40
20
0
Carbon Cost**
2007 Prices*
Return on Capital Employed (@ 15% p.a.)
Other non-production costs
Production - Variable
Production - Fixed
2007
Under a carbon price, domestic manufacturers would be more likely to import rather than invest in new capacity
an attractive economic return for investors would not be met by the Australian cement industry
importing clinker or cement has a lower risk profile than investing in new clinker manufacturing capacity
the two new kilns currently being considered would be unlikely to be built in Australia
A carbon cost would effectively write down the value of cement manufacturers' existing large plants assets to close to zero
Note: *Eastern States IPP and Prices; ** Carbon cost calculated at $35/tonne and with plants emitting 0.8 tCO2/t cementitious
Source: CIF, ABL, Boral, Cement Australia, L.E.K Analysis
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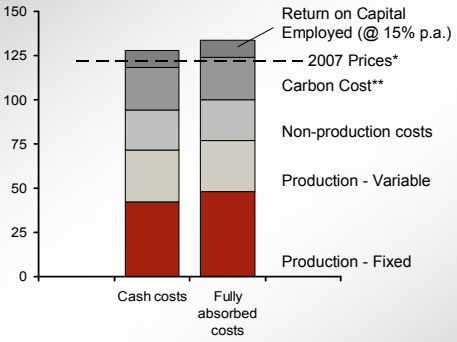
Furthermore, some existing plants could close as it would be more economic for domestic manufacturers to switch to imported product

Economics for a Small Plant^
Index (100 = IPP 2007)



- With a carbon cost, producers would barely recover cash costs on some plants
- In the long term, these plants would most likely be closed by domestic manufacturers, who would move their clinker production overseas, rather than invest in their upkeep
- Economics between plants differ and the reaction would be granular. Initial responses might be a stop of upgrade investments and a reduction of maintenance activities to extend periods of positive contribution of individual plants prior to their closure

Note: * Eastern States prices and IPP; ** Carbon cost calculated at $35/tonne and with plants emitting 0.8 tCO2/t cement; ^ Based on data for plants of 300kt to 500kt capacity
Source: CIF, ABL, Boral, Cement Australia, L.E.K Analysis

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In some areas, the cement industry is the main industry and largest single source of employment. Closing down the cement operations would have significantly negative effects on the local economy through unemployment and lost GDP

Railton and Kandos Case Studies: The Cement Industry's Contribution to Local Communities

	Railton (Large plant)	Kandos (Small plant)
Cement plant employment (FTE*)	230	125
Employees as percentage of labour force within 15 minute drive time	9.6%	17.5%
Indirect jobs from plant	1,150	625
Indirect jobs as percentage of labour force within 30 minute drive time	6.5%	58.0%
Average yearly salary for cement workers in Australia	$82k	

- The cement industry is a significant employer of technically skilled workers in regional areas: Berrima, Maldon, Kandos, Angaston, Railton
- As well as direct employer, these facilities require local services for maintenance, supplies and construction facilities
  - "… Indirect employment generated is about four times the direct employment bringing substantial economic benefits to local communities as well as the broader economy …"
    Cement Industry Federation Sustainability Report, 2007
- Gross value added per cement employee in Australia was $395k in 2007 and salary was c. $82k

Note: *Full-time equivalent
Source: CIF, Cement Australia, ABS, L.E.K. Analysis

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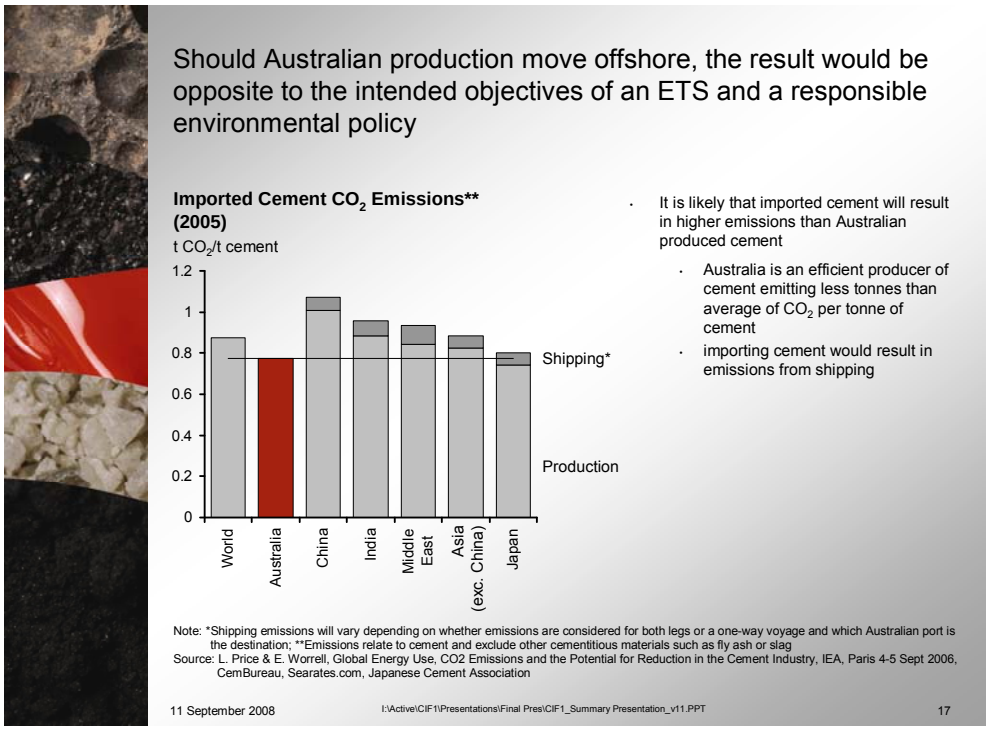
Should Australian production move offshore, the result would be opposite to the intended objectives of an ETS and a responsible environmental policy
Imported Cement CO_2 Emissions** (2005)
t CO_2/t cement
1.2
1
0.8
0.6
0.4
0.2
0
World
Australia
China
India
Middle East
Asia (exc. China)
Japan
Shipping*
Production
It is likely that imported cement will result in higher emissions than Australian produced cement
Australia is an efficient producer of cement emitting less tonnes than average of CO_2 per tonne of cement
importing cement would result in emissions from shipping
Note: *Shipping emissions will vary depending on whether emissions are considered for both legs or a one-way voyage and which Australian port is the destination; **Emissions relate to cement and exclude other cementitious materials such as fly ash or slag
Source: L. Price & E. Worrell, Global Energy Use, CO2 Emissions and the Potential for Reduction in the Cement Industry, IEA, Paris 4-5 Sept 2006, CemBureau, Searates.com, Japanese Cement Association
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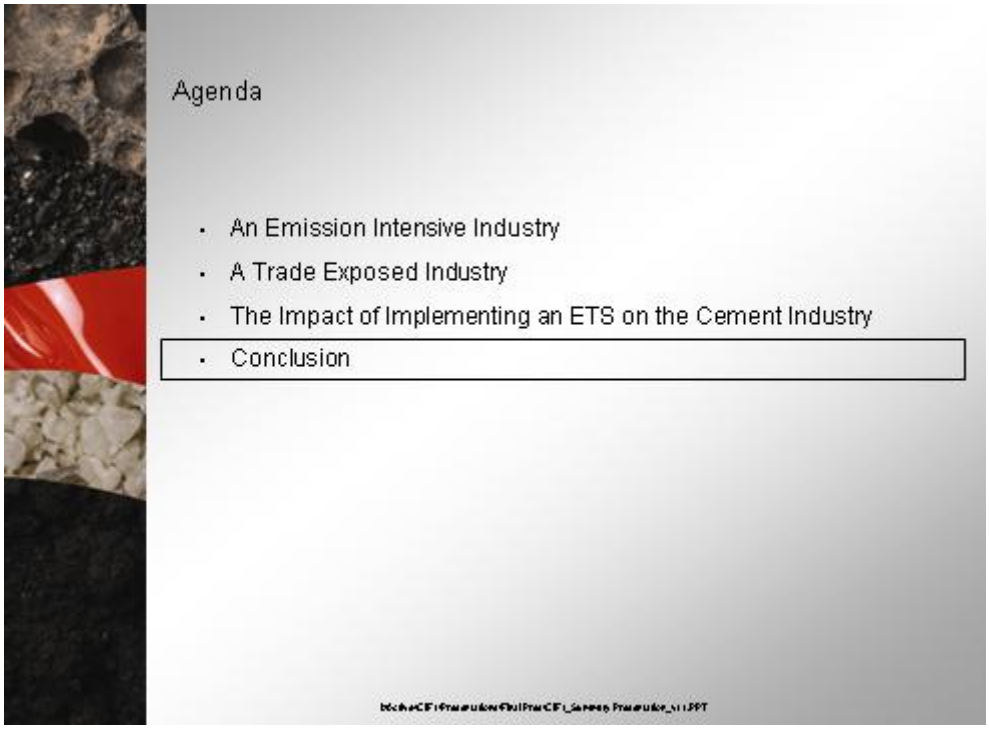
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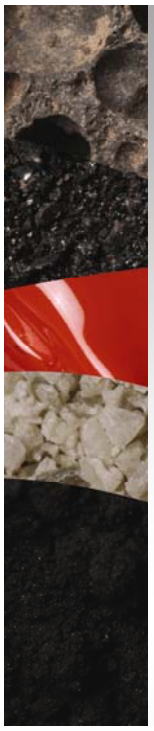
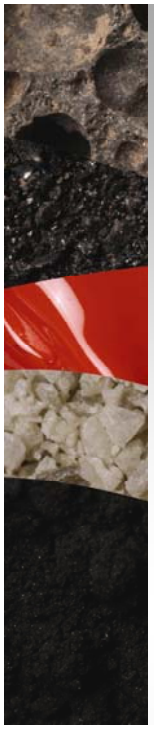


In summary, the cement industry is a trade-exposed and emission intensive industry

- The cement industry is emissions intensive
  - The production of cement emits CO2 as a by-product of the reaction process, through combustion of kiln fuels and through consumption of electricity
  - With emissions amounting to approximately 12 kg CO2,eq per dollar of GDP, cement is highly emission intensive relative to other sectors
  - At a carbon price of $35/t, the cost of CO2 emissions would amount to the equivalent of 35% - 40% of the gross-value added by the industry
- The cement industry is trade exposed
  - Large volumes of cement are internationally traded with Asia-Pacific trading volumes amounting to eight times Australian demand
  - Australia currently imports a significant amount of the cement it consumes
  - There is excess capacity in Asia-Pacific of approximately 20 times Australian demand
  - There is import infrastructure in Australia to meet the majority of domestic demand immediately and all of Australian demand in the near term as well as access to customers
  - Australian cement prices are close to, and have followed IPP prices



It is thus critical that issues relating to its competitiveness are adequately addressed by an ETS

- The impact of implementing an ETS is likely to represent an additional cost equivalent to c. 37% of the cement industry's GDP contribution. This incremental cost can not be passed on to customers
- If specific provisions for the cement industry's trade-exposed, emission-intensive nature are not included in the ETS scheme then:
  - Construction of new kiln capacity in Australia is unlikely to provide sufficient returns to justify the investment
  - The viability of existing manufacturing facilities will become questionable
  - Regional communities which are dependant on the cement industry for employment could be adversely affected
  - And, global carbon emissions would likely be increased due to cement production being shifted offshore to kilns that are likely to have higher emissions, and sea freight being required to transport the cement to Australia
- In order for the Australian ETS to meet its stated aims of reducing carbon emissions, the design has to address the issue of competitiveness of the Australian cement kilns

Appendix B: Clinker manufacturing activities

Mineral blending and clinker burning

Typically 90% or more of feed to the cement kiln is a carefully selected blend of four minerals; calcite, alumina, ferric oxide and silica. The materials provide the necessary calcium oxides for clinker making and suitable grades for cement clinker can be found in many regions of the Australia. Limestone quarries operate in daily contact with the cement plant, are usually located nearby and are dedicated to suppling daily quantities of stone to a physical and chemical specification Energy use in the quarry is sourced from diesel fuel for mobile equipment, blasting and power to drive crushing and conveying operations.

To ensure efficiency in the clinker kiln the kiln feed must be carefully prepared to specific physical and chemical conditions. To enable these operations to be conducted efficiently the proportioning of the raw materials, the drying, grinding and blending are all conducted as part of the kiln operations, in modern processes in particular there are direct linkages of material and air flows to ensure the maximum use of heat and conveying are gained from the initial input of energy. Consequently **if the kiln is not operating all other process steps are also shut down**.

Cement grinding

Once the cement clinker is produced it is transported to the finish grinding stage where with additions of gypsum and other minerals the construction material “cement” is produced.

Appendix C: Kiln Technologies

Extract from European Commission Joint Research Centre *"Energy consumption and CO2 emissions from the world cement industry"* (June 2003)

Basically two types of kiln are used for the pyro-processing of the raw materials: vertical kilns (shaft kilns), and rotary kilns. Rotary kiln is a tube with a diameter of up to 6 meters, with a longitude of 10-20 times its diameter in case of short kiln, and 32-35 times in case of long kilns. The kilns are installed with a slope of 3-4 degrees with the horizontal and are rotating slowly to move the raw material towards the direction of the flame to the lower end of the kiln. The seven different kiln technologies are listed below:

Type 1 - Wet rotary kiln

If the water content of the raw material is high (between 15-25%) usually wet slurry is produced to feed the kiln. The kiln feed contains around 38% water. The advantage of the process is to have more homogeneous meal for the kiln, and less electricity consumption for the grinding. The disadvantage is that water must be evaporated in the kiln, which results in much higher total energy consumption, usually between 1.8-3 GJ/tonne. In places where water content of the raw material is high (GB, Belgium), this process is still an existing technology of cement making.

Type 2 - Semi-wet rotary kiln

In the semi-wet process, the wet raw material is processed in filter presses after homogenising, resulting in lower moisture content. It is an improvement of the wet process, and mainly used for retrofitting the existing wet kilns. The process can reduce energy consumption compared to the wet process up to 0.3 GJ/tonne of clinker.

Type 3 - Semi-dry rotary kiln

In the semi-dry rotary kiln moisture content is reduced by using waste heat recovered from the kiln. Then this dried meal is introduced into the kiln. This kiln type is also referred as Leopol kiln.

Type 4 - Dry long kilns

This group includes both long dry kilns without preheater and kilns with preheater. The preheater could be shaft pre-heater or a one stage cyclone pre-heater. This technology still has high energy consumption compared to new technologies, because the pre-heater is missing, or not as efficient as the new multi-cyclone preheaters.

Type 5 - Dry kilns with preheater

This category includes kilns with multi-staged (4-6) cyclone preheaters. The raw material travels through the cyclones, where each following cyclone has higher temperature. Earlier in the 1970's 4 stages preheating was the most wide-spread installation, now 5 or 6 stages pre-heater kilns are constructed. The energy consumption of kilns with suspension pre-heaters is much smaller, than the previous categories, they consume energy between 2.9-3.5 GJ/tonne. One disadvantage of the process is that alkali can build-up and collect in the preheater, which should be separated from the exhaust gas. This usually leads to extra energy use. The alkalis reduce the quality of the cement, and can block the operation of the preheater, which could results in long interruptions in operation.

Type 6 – Dry kilns with preheater and pre-calciner

In this process an extra combustion chamber is installed between the preheater and the kiln. This pre-calciner chamber consumes 60% of the fuel used in the kiln, and 80-90% of the calcination takes place here. There are many advantages of the pre-calcinating process. It further decreases energy consumption by 8-11%. Secondly combustion in this chamber is at lower temperature as in the kiln, so lower grade fuel can be used (e.g. wastes, waste fuel). This can lower the NO_x emission because of the lower burning temperature. Kiln length could be further reduced to a length/diameter ratio of 10.

Type 7 - Shaft kilns

Based on a different technology, significant number of shaft kiln can only be found in developing countries, such as China and India. They are operated only in those countries, where lack of infrastructure, lack of capital, or other factors makes them viable. Shaft kilns are vertical installations, where raw materials are travelling from the top to the bottom by gravity. Raw material is mixed with the fuel and feed from the top, while air is blown from the bottom. There are certain disadvantages of the process. Clinker quality is highly dependent on the homogenisation of pellets and fuel, and on the air supply. Inadequate air supply or uneven air distribution makes combustion incomplete, resulting in low quality clinker and high CO and VOC emissions. In theory, shaft kilns can almost reach the energy efficiency of the rotary kilns, but in practice their energy consumption vary between 3.7-6.6 GJ/tonne of clinker, with the average of 4.8 GJ/tonne in China and India.