



13 May 2009

Waste Policy Taskforce
Department of the Environment, Water, Heritage and the Arts
GPO Box 787
Canberra ACT 2601

A National Waste Policy: Managing Waste to 2020

The Cement Industry Federation (“the CIF”) welcomes the opportunity to provide comments on National Waste Policy: Managing Waste to 2020 consultation paper (“national waste policy”).

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, Blue Circle Southern Cement Ltd and Cement Australia Pty Ltd. Together these companies account for all of the integrated production of clinker and cement in Australia. Their operations are located in every state and territory, and include 15 manufacturing sites, 10 mines and over 70 distribution terminals. In 2008, the industry employed 1850 people and produced over 10.6 million tonnes of cementitious materials, with an annual turnover in excess of \$1.97 billion. In Australia, the industry is responsible for nearly 7.1 Mt per annum of greenhouse gas emissions.

In collaboration with its member companies, the CIF works to advance a competitive and sustainable Australian cement industry that is committed to best practice in all areas of cement production, as well as responsible management of our nation’s resources.

Introduction: The Australian Cement Industry and Resource Recovery

The Australian cement industry’s viability is dependent upon minimising costs, advancing the industry toward greater sustainability and maintaining a “social licence to operate”. In this regard, the industry has been innovative and creative in reducing its environmental footprint via the uptake of alternative fuels, raw materials and supplementary cementitious material - predominantly sourced from secondary materials/by-products. These actions not only conserve natural resources (for example coal, gas, limestone, iron ore, sands and shales) and reduce landfill, but in many cases also reduce greenhouse gas and other emissions.

The cement industry is at the forefront of resource efficiency initiatives, which have been achieved through research and development programs and innovation. The versatility of the cement manufacturing process enables the safe use of certain secondary materials from other manufacturing processes, and has resulted in the progressive uptake of supplementary cementitious materials or SCMs (materials which exhibit cementitious properties in the

presence of lime released during the hydration of cement), non-traditional or alternative raw materials (materials containing calcium, silica, alumina or iron), and non-traditional or alternative fuels (having calorific value and in some cases recyclable raw material components). Figure 1 indicates the range of secondary / by-product material opportunities for the cement industry

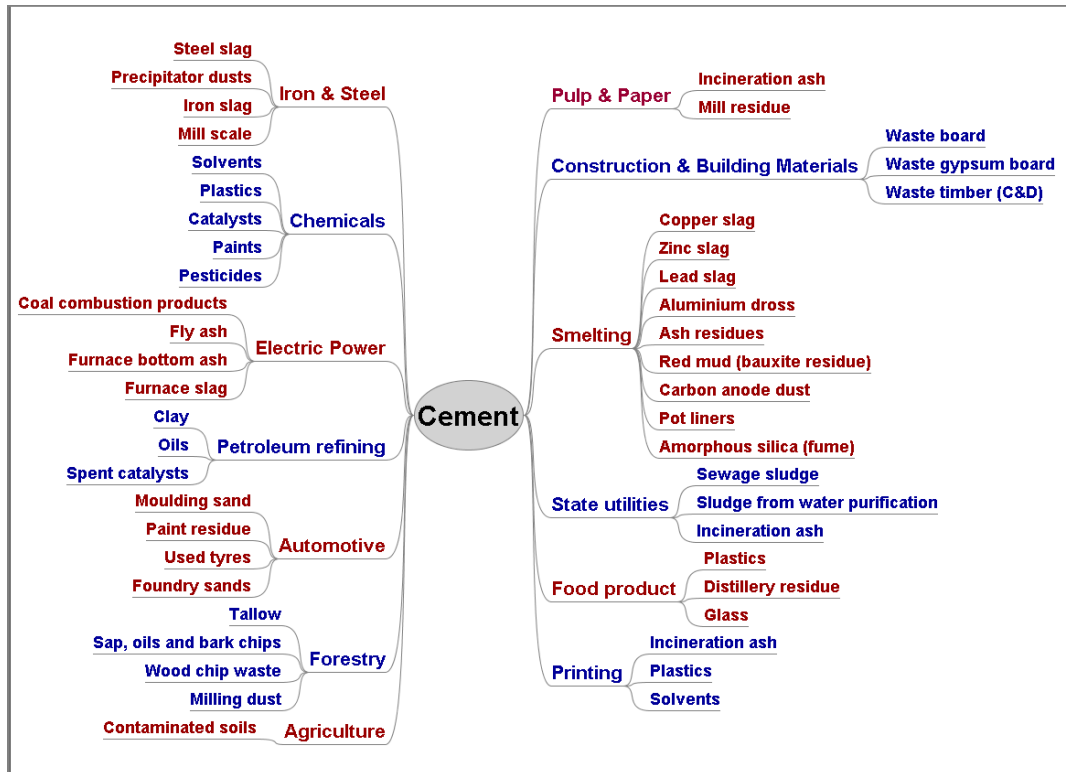


Figure 1 – Secondary / By-Product Material Opportunities for the Cement Industry

For the year 2007/2008, approximately 120,000 tonnes of solid and liquid alternative fuels (or 7% of our total thermal energy requirements) were safely converted to energy, 670,000 tonnes of alternative raw materials were utilised conserving natural resources, and over 1.5 Mt of supplementary cementitious materials (SCMs) (in a total market in excess of 10Mt of cement and cement materials) were introduced to the market (see figure 2). During 2008, the Australian Cement Industry accepted 53 times more waste than it produced. **These figures make the cement industry one of the largest recyclers in Australia.**

Globally, particularly in Europe and Japan, the cement manufacturing process is recognised for its contribution to sustainable resource management. Internationally the cement industry has made significant achievements in the use of alternative resources over the past 30 years which have not been able to be realised in the Australia industry due to a number of factors including:

- the abundant opportunities and low cost of land filling which has diminished the market incentive to establish resource recovery
- outdated and inconsistent waste and recycling legislation within State and Federal jurisdiction which results in regulatory uncertainty or disincentives to drive progress supporting resource recovery.

In particular, State approaches vary to defining, classifying and regulating wastes. This leads to increased ambiguity and confusion, and forms barriers to progressing innovative initiatives for end use. Opening legislative requirements and approval processes to move progressive

approaches to the re-use of alternative resources, encourages the opportunities for the industry to adopt more sustainable practices and reduce its environmental footprint.

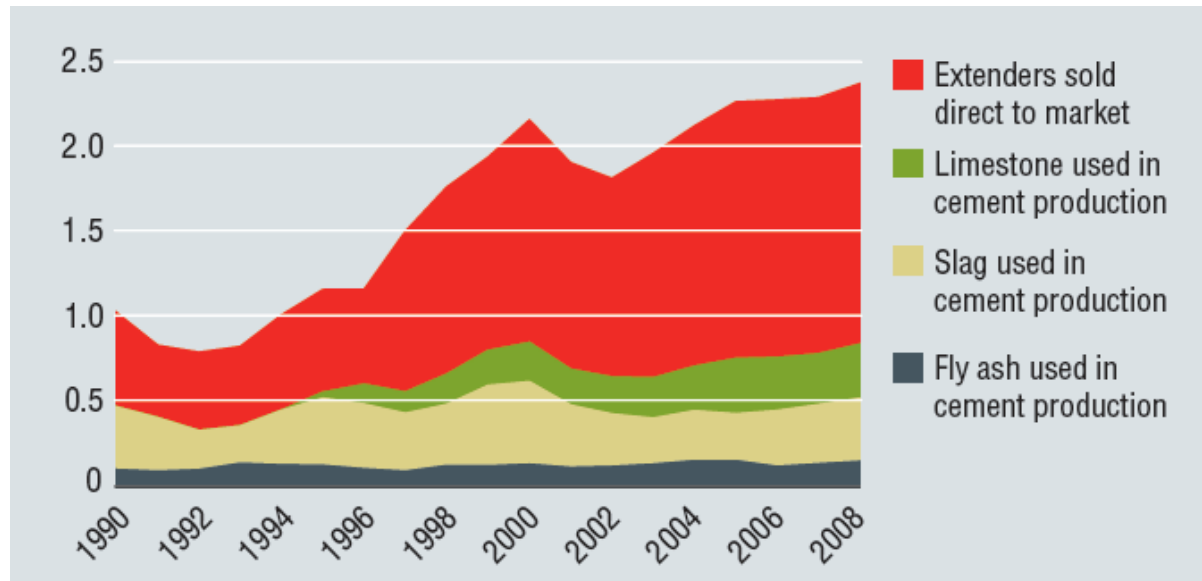


Figure 2 – Cement extenders used in cement production and sold for concrete production (millions tonnes)

The Australian cement industry recognises the need to conserve non-renewable resources, and supports recovery resources to their fullest economic potential in a safe and environmentally responsible manner. In this regard the cement industry plays a valuable role in maximising the utilisation of latent energy and material value within by-products and waste material, thereby providing a high standard of sustainable and environmentally beneficial alternative to disposal.

A large amount of additional information has been included in the appendices of this submission. Appendix A provides a background of secondary materials used as kiln fuels and raw materials. Additionally, an outline of the current contribution the cement industry has made to resource management in Europe and in Australia has been included. Appendix B includes examples of waste regulation working with and against industry. Appendix C and D outline the recommendations of the Cement Industry Action Agenda and the Productivity Commission Inquiry into waste generation and resource recovery, to develop and implement a national definition of waste. Appendix E includes a decision tree developed by the European Court of Justice to determine when material is being recovered for valued use and when it is being sent for disposal.

1.0 Consultation Paper

The CIF believes outdated and inconsistent waste and recycling legislation within State and Federal jurisdiction results in regulatory uncertainty or disincentives to drive the progress of supporting resource recovery. In particular, State approaches vary to defining, classifying and regulating wastes. This leads to increased ambiguity and confusion, and forms barriers to progressing innovative initiatives for end use. Opening legislative requirements and approval processes to move progressive approaches to the re-use of alternative resources, encourages the opportunities for the industry to adopt more sustainable practices and reduce its environmental footprint.

The CIF has developed its own set of principles to drive resource recovery and suggests the National Waste Taskforce adopt the following:

1. Minimise the regulatory red tape that controls the use of waste differently to traditional materials, and duplicates requirements of next users, resource recovery operations and generators
2. Redefined “waste” nationally to mean materials destined for disposal while “resource recovery” materials are recognised as passing into a next use.
3. Use waste levies as an incentive to support the development of resource recovery industry and to reduce waste to landfill
4. Replace “exemptions” for processes using waste with legislation that is supportive of “resource recovery”
5. Focus regulatory control on ensuring acceptable process emissions standards are set to ensure public health and environmental standards are maintained
6. Allow market forces to determine Higher Valued Use for recovered resources
7. Utilise international best practice to support resource recovery development
8. Recognise the traits of resources being recovered, for example:
 - a. Resource recovery opportunities are often regional due to the cost of transport,
 - b. Resource recovery streams change as new opportunities with higher values become viable and waste reduction strategies are implemented,
 - c. Processes such as cement manufacturing should be recognised for their robust nature and highly technical control.

1.1 Regulatory red tape

Red tape and regulatory indecisiveness creates uncertainty for testing and adoption of “non-traditional” practices, stifling up-take of innovative opportunities. Resource recovery is a practice that will constantly challenge the use of traditional resources and practices. To maximise these opportunities, regulators need supporting legislation that addresses the issues of concern to public health and the environment and allows the authorities to assess the impact decisively, objectively and transparently.

Industry also needs regulations that are simple to apply, consistent and not requiring onerous special reporting, that are not duplicated either within State legislation or across State and Federal Acts. Appendix B includes examples of waste regulation working with and against industry.

The duplicative and inconsistent regulation to manage waste that arises through already licensed facilities having to additionally gain approval for materials being beneficially reused is an issue.

For resource sustainability to become a reality in Australia, we believe that these two identified concerns must be addressed. Options to achieve this are considered to include:

1. substantially improved definitions and classification systems;
2. provision of legislative mechanisms that allow for wastes, by-products and secondary materials to cease to be wastes; and
3. an acceptance that environmental harm that may be associated with the use of non-traditional fuels or the processing or reuse of by product materials is best addressed through appropriate scheduled activity emissions limits – rather than by input material limitations.

1.2 Definition of Waste and Resource Recovery

Of critical importance is how to determine what **is** a waste and what **is not** a waste. The CIF does not support **a wholesale declassification to the waste status**. Declassification to the waste status should under no account lead to attempts to by-pass essential legislation which could lead to an overall negative perception of resource recovery processes. However we do suggest that no material is a waste until it is deposited in a registered landfill or incinerator. Once the decision is made to dispose of the item or substance then standard waste procedures apply, for example, levies, data capture and tracking.

Other by-products going to next use should be classified as recovered resources, and those sites that take in such materials and prepare them for next use should not be considered “waste depots” but rather a high level of operation, more closely linked with manufacturing standards. “Resource recovery” requires sophisticated equipment and processes, management of stock level and product specifications and development of trained employees.

CIF considers that **by-product** materials of an industrial production process are not necessarily wastes. The **rulings of the European Court of Justice** contain sufficient criteria to define by-products (see decision tree in Appendix E). By-products should be regulated as any other process material is managed, based on its chemical and physical characteristics and its use in a process. In this respect, any **definition of by-products** should clearly state that:

- A by-product (good or material) results from an extraction or manufacturing process, where the **primary aim is not the production of that substance**, and
- The undertaking **intends to benefit or market** the by-product in a subsequent process, and
- By-products have an **economic value** as products able to be **further processed prior to reuse** as part of the continuing process of production, and
- Such a **reuse** is not a mere possibility but a **certainty**, and
- By-products are **subject to the legislation applicable** to those products and raw materials/resources, as well as their transport, storage and production, further processing or use, especially with regards to environmental requirements.

1.3 Waste levy

The CIF supports the use of waste levies as an incentive to support the development of resource recovery industry and to reduce waste to landfill. The cement industry recognises the value of the use of a blunt regulatory instrument to drive the difference between waste disposal and resource recovery. In Queensland and the Northern Territory, there is no landfill levy or any prospect of this changing in the near future. In Western Australia the levy is \$7 per tonne, insufficiently low to support a resource recovery industry of proportional size for the states industrial activity. In addition the advantage of planning for changes to the levy is important to both generators and next use industries. A five to ten year waste levy projection would assist this point.

1.4 Supportive regulation for Resource Recovery

Current practice to regulate industry utilising recycled materials with “exemptions” promotes a negative perception of a site’s ability to manage its processes, for example, a well operated plant at world best practice using alternative fuels would be required to operate under an Environmental Licence exemption condition. This approach needs to be addressed.

The contingent liability of the product in the market becomes difficult again when the dated definitions and perceptions of waste are associated with the product. The progressive initiative of eco-efficiency is lost, the perception that waste materials used in a product are inferior, is being supported by special licensing and the reference to “waste”.

In translating policy to market outcomes, the continuation of regulations referencing materials being recovered for use as “wastes”, results in the resistance to embracing their use. Community groups, regulators, customers, our own employees and management perceive the use of “waste” materials as a degrading step for both process and environmental controls, and product performance.

1.5 Focusing regulatory control on emissions

With the changing opportunities of the resource recovery industry’s ‘next use’ customers and the changing composition of both sources of by-products and waste, regulating the inputs to a process, especially only the non traditional materials, becomes difficult and inadequate. However expecting the facility to monitor its raw material inputs, and regulate the emissions from the process responsible environmental performance can be assured and varying sources of recovered materials can be accommodated.

Regulating emissions regardless of process inputs would relieve a great deal of licensing burden. **There is no doubt that input controls are counter productive.** Environmental damage must be as a result of outputs from reuse, recycling. energy recovery or disposal activities.

Controlling and measuring the outputs of such activities is the surest way of preventing such damage and at the same time ensuring that resource efficiency, sustainability are maximised and landfilling minimised. Trying to control the damaging outputs risks creating situations where new technology is developed that enables safer and lower emission processing to achieve resource efficiency and sustainability.

Hazardous materials are particularly susceptible to such doubling up of controls. It is clear that a substantial driver of the regulatory red tape issues raised earlier creates and is driven by this input versus output control duplication.

In the case of Persistent Organic Pollutants (eg PCBs and OCPs) as covered by the Stockholm Convention, excessive input controls have prevented Australia adopting Best Available Technology with Best Environmental Performance as designated in the Convention.

1.6 Higher Value Use

The CIF believes all levels of governments should encourage a shift away from waste disposal towards true resource recovery, reflecting modern resource management practices and the environmental benefits that this can bring. The CIF fully supports a ***clear three level waste hierarchy***:

- Prevention and reduction of waste production eg cleaner production
- Recovery, eg re-use, material recycling and energy recovery
- Disposal eg landfill and incineration

Lifecycle thinking and lifecycle assessment are tools that are complementary to the waste hierarchy to distinguish between recovery and disposal.

The CIF supports a waste hierarchy where all recovery operations are considered at the same level and where market forces are allowed to operate freely. We do not support subsidised recovery operations where a process cannot demonstrate economic sustainability.

1.7 International Best Practice

The Cement Industry supports the acceptance of best practice international standards and guiding principles. Resource Recovery has advanced more quickly in Europe than Australia and there is a great deal of experience our industry has gained through technical associations and organisations like the World Business Council for Sustainable Development - Cement Sustainability Initiative (WBCSD CSI). Alternative fuels and materials that come from regional opportunities will have specific requirements but the best practice standards should still be applied. As a minimum standard, all CIF member companies using alternative fuels and raw materials follow the World Business Council for Sustainable Developments "Guidelines for the selection and use of fuels and raw materials in the cement manufacturing process" which are built upon the principles of sustainable development, eco-efficiency and industrial ecology, and the best practice of the global industry.

2.0 Hazardous Waste – The Victorian Model.

The proposed Victorian *Environment Protection (Industrial Waste Resource) Regulations 2009* offer an excellent model on which the Hazardous component of the National Waste Policy can be based. These regulations clearly designate three categories of hazard and provide a step through process to maximise higher order reuse, recycle, energy recovery or treatment of all industrial waste streams. They can minimise red tape and enable direct beneficial reuse.

The Victorian use of increased levies on hazardous waste to landfill has also proven highly successful in directing waste from landfill for reuse, recycle, energy recovery and by utilising the levy funds for grants to assist in establishing new processing options has enabled innovative, state of the art technologies to be implemented.

3.0 Product Stewardship Schemes

As a significant user of secondary materials for the purpose of realising energy value, we are aware that concerns exist that, should the cement industry establish itself as a major user of certain secondary materials, higher order uses may be precluded. The industry's experience globally shows that, in many of these cases (and without any market intervention), market forces of themselves will drive higher order fates over time.

The cement industry has experience with the development of other uses for waste streams that are utilised by the cement industry. When they develop and demand a higher price for the waste streams, for example waste oil and solvents, the supply available to the cement industry diminishes. This is the inevitable market forces at work. It should be acknowledged that these alternatives will develop as opportunities in collection and pre-processing grow. They should each be assessed for their environmental impact.

The cement industry considers that product stewardship schemes may be appropriate for some products in certain markets, but that their role may not be well suited to addressing market failures. If the market failure is deemed to be a loss of material or energy resource to landfill, then increasing landfill controls or cost adjustment is considered to be a more efficient means of driving market readjustment. However, either option increases the risk of illegal dumping unless commercially and technically viable alternatives exist. This is also the case with product stewardship schemes which, while providing additional monetary resources to assist in the development of new technologies, are still dependent upon the research and development cycle and the not insignificant assumption of a viable market.

We do not support product stewardship schemes that provide a differential benefit to different technologies. We believe that product stewardship schemes where “winners” are picked and supported is not good economic practice and will result in technologies remaining economically unviable and requiring taxpayer-funded, economic support indefinitely. It is our belief that if a product stewardship scheme is initiated then it's benefit is to raise the overall value of a secondary material in order that markets will develop with viable markets succeeding. We do not believe that Product Stewardship schemes should interfere in natural market development by “picking winners” through benefit discrimination. Two examples of “picking winners” include the Product Stewardship for Oil and the proposed Product Stewardship for end of life tyres.

3.1 Product Stewardship for Oil (PSO)

By way of an example, Geocycle Pty Ltd, a subsidiary of Cement Australia Pty Ltd, collects mainly liquid and some solid wastes from industry across Australia and formulates these wastes into a fuel for use by cement kilns. The fuel is designated Solvent Based Fuel (SBF) due to its largest component historically being solvents from out-of-specification, or spent paints, inks and other similar materials. When used by a cement kiln, SBF replaces an equivalent weight of coal.

Over time, Geocycle has seen a steady trend away from the more manageable, clean, high calorific wastes towards more difficult to manage materials. This trend has also been seen within the used oil market with the economics of utilising used oil becoming less economic, significantly increasing the unit cost of processing SBF. As a result Geocycle has moved to sourcing used oil only as a last resort for use in its processes. This trend is anticipated to increase further by the cessation of the additional benefits from 30 June 2009. Consequently Geocycle has invested heavily in processing equipment able to manage the more difficult to manage materials with a net reduction in volumes of category 5 and category 6 materials being taken. Geocycle's actions are indicative of the cement industry moving away from accessing used oil due to the unfavourable economics (which we believe is partly driven by its classification and treatment under the PSO). It also highlights that over time the cement industry is becoming less likely to play a role in assisting to overcome the market failures that are the rationale for regulatory approach taken by the PSO.

Anecdotally we understand that in some instances the PSO scheme has resulted in the effective splitting of used oil streams between easier and more difficult materials. The recent Western Australian experience is a case in point where light used oil fractions were sold off collecting both a higher market price and PSO benefit, but leaving behind a more difficult waste stream attracting a lower benefit if it were to be processed as low grade burner fuel, for example by Geocycle.

The Western Australian experience highlights two key areas of market failure that are currently not addressed by the PSO:

1. the ability for producers (particularly in the higher subsidised categories) to effectively "cherry-pick" the higher value light fractions and receive the PSO benefit without having to address the more difficult waste stream
2. the issue surrounding regional areas where collection and transport costs are significantly higher than areas where infrastructure to process waste oil already exists

By providing subsidies solely on end use and providing such a disproportionate proportion of the available PSO funds towards re-refined base oil as end use, the PSO is not addressing these key areas of market failure. We suggest that the PSO also take into account the intrinsic value of the material and the location of the material in providing its subsidies. It makes little sense to provide the same level of subsidy to what are already the highest value materials (i.e. light fractions and close to processing facilities) while failing to address the specific issues associated with the lower value materials, where the key market failures are likely to occur..

We note the Productivity Commission's comments that:

"However, the administrative arrangements for the Program appear complex and the recycling subsidies introduce a distortion into the market for recycled oil."

and; "... the subsidies should be based on the externalities avoided, not 'infant industry' arguments or favouring particular industries in a manner suggested by the waste hierarchy."

In looking at reforms to the PSO we also refer to the 2004 Independent Review of the *Product Stewardship (Oil) Act 2000* by The Allen Consulting Group, which concluded that:

“..... since the introduction of the PSO Program a number of life cycle analyses have been undertaken of oil. These analyses suggest that lube-to-lube recycling, which is explicitly favoured in the PSO Program, is likely to be the most beneficial form of recycling, but that **high temperature burning of oil provides similar (or at least only slightly smaller) environmental benefits.** This in turn suggests that the existing differential, at least lube-to-lube versus high temperature burning, should be narrower.”¹

and makes recommendations including: (recommendation 2)

“The benefit rate for high grade burning oil should be increased relative to the benefit rate for lube-to-lube oil.”²

¹ The Allen Consulting Group 2004, *Independent Review of the Product Stewardship (Oil) Act 2000*, The Allen Consulting Group, Sydney, p. 58

² The Allen Consulting Group 2004, *Independent Review of the Product Stewardship (Oil) Act 2000*, The Allen Consulting Group, Sydney, p. 58

4.0 Conclusion

The important contribution the cement industry can make to a nation's waste management infrastructure has been explicitly recognised by several state governments. The practice of employing alternative fuels and raw materials in cement plants supports the establishment of a sound waste management industry, and essential principles of the waste management hierarchy. The establishment of the reuse of larger volumes can and has opened innovation in higher value uses for waste materials through encouragement of recovery and segregation of valued waste. To this end the cement industry continues to contribute to the furtherance of sustainable development in Australia.

The CIF commends the development of a national waste policy and strongly encourages the National Waste Taskforce to address the regulatory impediments raised in this submission and adopt the set of principles developed by the CIF to drive resource recovery.

Any inquiries should be directed to the undersigned. Thank you for the opportunity to provide this submission.

Yours faithfully,



Andrew Farlow

Sustainable Development Policy Manager

Appendix A

Background of secondary materials and the Cement Industries experience with Resource Recovery

Large volumes of secondary materials are used in cement manufacturing as alternative fuels and raw materials, providing a significant contribution to resource management and conservation. Unlike incinerators, the cement manufacturing process utilises energy from alternative fuels and minerals from alternative raw materials including ash and residues, ensuring that no additional solid waste stream arises. Other benefits of selecting alternative fuels and raw materials to substitute for traditional resources include: reducing the costs of production; reducing greenhouse gas emissions; improvements in energy efficiency; and the conservation of natural materials.

A common characteristic of all cement kiln systems is the long retention time at elevated temperatures. Kiln burner flame temperature is typically 2,000°C and material travelling through the kiln reaches 1,450°C as it forms clinker - an intermediate product of cement manufacturing. Cement kilns are energy intensive with fuels being the single greatest cost in production. Greenhouse gases emissions are also high per tonne of product with emissions forming from both energy use and the conversion of raw materials to clinker. Kilns are designed and operated to maximise energy use and minimise energy losses, this requires precise and continuous sophisticated monitoring of the process, the fuel and material feeds. The clinker is formed including the residue and contaminants from the fuel or raw materials, so the selection of suitable alternative materials and fuels must ensure they are complementary to the performance of the final product - cement. In addition, leaching tests on the final concrete product demonstrates that the clinker structure binds the elements of the residues permanently – whilst maintaining the environmental integrity of the concrete.

Secondary materials as kiln fuels and raw materials

Lowering energy costs is one of the main ways of improving the international competitiveness and sustainability of the Australian cement industry. More and more, cement plants are turning to using alternatives to fossil fuel and natural raw materials. Today, in Europe, alternative fuels provide on average about 12% (up to 72% in some individual plants) of thermal energy consumption to the industry. Waste materials such as used tyres, rubber, paper, used oils, used wood, paper sludge, sewage sludge, plastics, slags, animal meal are commonly utilised.

Pre-calcined and supplementary cementitious materials (SCMs) originate as the high-volume by-products of other industrial processes. Reducing the quantity of clinker required in concrete through the substitution of SCMs during the manufacture of cement and concrete lowers the greenhouse gas emissions per unit of cementitious material used and manages large volumes of normally land filled waste.

The industry currently substitutes 22% (about 2.3 million tonnes) of clinker with both mineral addition and SCMs such as fly ash and slag as blends in cement products or as sales direct to the premix industry for use in the concrete products markets. The Cement Industry Action Agenda includes a recommendation to increase the use of SCMs in cement and concrete to at least 29% by 2012.

Key environmental risk from the use of alternative materials

The high temperature and long material residence time implicit in the cement making process ensure that harmful organic substances are destroyed. Under these conditions, the destruction and removal efficiency of the most stable organic compounds exceeds 99.99 per cent. This meets the most stringent regulations, such as those required by the US EPA. Fuel ash, the solid residue of the combusted fuel, becomes incorporated into the crystalline structure of clinker and fixed in concrete.

Consequently, there are no solid by-products requiring disposal.

Dioxins and furans: A report commissioned by the Australian Government in 2002, indicated that emissions from cement and lime production combined were a minor source, accounting for less than 0.2 per cent of total dioxin and furan emissions to the Australian environment. The Australian cement industry has developed an extensive data set of dioxin and furan emissions from cement kiln stacks and supports international observations that emissions levels of dioxins and furans are normally independent of the type of fuel feed. The 2004 National Dioxin Program's study into bushfires as a major source of dioxins and furans production verified with their field tests that rapid cooling of exhaust gases, such as is conducted in cement kiln exhausts, creates the best environment for low production of dioxins and furans.

Heavy metals: The majority of heavy metals that enter the cement manufacturing process are inherent in the raw materials. During the process of clinker manufacture, these heavy metals (including the heavy metal constituents of any fuel used) predominantly become incorporated in very stable chemical combinations in the clinker. A small subset of higher volatility heavy metals have been identified as being of concern for cement manufacture overall, these are monitored in the recovered materials to ensure compliance with emissions regulations.

Particulate emissions: Process exhaust gases are passed through pollution control devices, such as electrostatic precipitators or bag filters. The particulates are captured and used through the kiln to make clinker. The use of alternative fuels and resources in cement manufacturing does not increase particulate emissions from the process.

Sulphur dioxide: The high levels of limestone used in the cement manufacturing process neutralize the majority of acidic gases, including sulphur compounds.

The European Cement Industry

The use of such materials in European cement plants has proven to save fossil fuels, equivalent to approximately 3 million tonnes of coal per year. The cement industry is recognised by some European Governments as an essential part of their waste management policy. A ruling delivered by the European Court of Justice on 13 February 2003 holds that using waste as a fuel in cement kilns is to be classified as **recovery**, while burning municipal waste in dedicated incinerators, even with energy recovery, is to be classified as **disposal** (www.cembureau.be). The ruling was a major step towards recognition by policymakers of the environmental and economic advantages of valorising waste in cement kilns.

In February 2007, the European Court of Justice released a communication to explain the definition of waste set down the Waste Framework Directive. The European Court of Justice addressed the issues of by-products in relevant industry sectors, and when by-products should or should not be considered as waste in order to clarify the legal situation for economic operators and competent authorities (see Decision tree in Appendix E).

Australian Cement Industry

In Australia, alternative materials may be sourced from by-products of other manufacturing processes or from end-of-life products. Unfortunately, such materials are commonly classified as “wastes” under existing state regulatory regimes and this can constrain legitimate resource conservation efforts. Regardless, the industry is focused on identifying opportunities for utilising materials which retain value as either energy content and/or material substitution, and where this value can be realised by the cement industry, provided their use makes economic and environmental sense. Examples of the by-products and waste products currently used as alternative fuels in Australia include tyres, demolition timber, tallow, carbon or anode fines, spent cell liners, waste oil, coke breeze and blended solvents. While the industry has been safely using these materials for many years, the processes, practices and techniques to do so are generally part of individual company procedures, and thus not well known to a broader public. Stakeholders hold legitimate concerns about the effects of changes to processing being introduced by the cement industry, particularly in air emissions, product performance, transparency, communication, standards and regulation are all important elements to establish an environmentally responsible process for the use of alternative resources.

As a minimum standard, all CIF member companies using alternative fuels and raw materials follow the World Business Council for Sustainable Development’s “Guidelines for the selection and use of fuels and raw materials in the cement manufacturing process” which are built upon the principles of sustainable development, eco-efficiency and industrial ecology, and the best practice of the global industry.

Appendix B – Examples of Waste Regulation working with industry

The Waurm Ponds site operated by Blue Circle Southern Cement (BCSC) in Victoria has pioneered the use of alternative fuels in Australia. Currently 50% of the plant's energy requirements are derived from alternative fuels. This provides significant cost savings to the business while diverting some 40,000 tonnes per annum of material from the waste stream and conserving over one million gigajoules of natural gas annually. Extensive trials have ensured that use of alternative fuels has not compromised the quality of the environment or the quality of the cement produced. The results of environmental monitoring are reported annually to the EPA and to the Community Liaison Committee.

Energy recovery is recognised by the Victorian EPA as one of the options available for the management of waste through resource recovery. The alternative fuels programme at BCSC, Waurm Ponds has been developed in consultation with the Victorian EPA and the community. The EPA has implemented a regulatory framework for the cement kiln process that involves monitoring the inputs as well as controlling the emissions from the process to ensure the requirements of the State Environment Protection Policy for air quality indicators are satisfied.

Cement Australia's Geocycle Plant in Victoria provides management for the alternative fuels operation within Cement Australia. The Dandenong site is a blending platform for solvent-based alternative fuels (SBF) which provides a conduit for waste between the generator and the environmentally sustainable resource management outcome provided by using alternative fuels in cement kilns. The plant is able to take sludgy materials and even solid waste materials, and homogenise them into a high viscosity fuel. The liquid fuel is transported to Gladstone, Queensland and Railton, Tasmania and is used to supplement coal as kiln fuel. The use of low carbon fuels has a positive impact on CO₂ emissions when compared to coal as a fuel source.

Cement Australia is currently extending the waste processing capability of its Geocycle plant with the introduction of innovative equipment, enabling conversion of a broader range of wastes into kiln fuel. The new plant embraces the Victorian EPA's waste strategy by converting waste materials that have traditionally ended up as landfill into usable alternative fuels for cement kilns. It also provides a sustainable waste management solution for Geocycle's customers who require environmentally sound and sustainable solutions to their waste management issues. It is anticipated that 15,000–20,000 tonnes per annum will be processed through the plant from the end of 2008, and ultimately as much as 25,000 tonnes per annum could be processed using this technology saving potentially 40,000 tonnes per annum of CO₂.

The high-level of acceptance of resource conservation through this process has led the Victorian EPA to recognise that processing of such secondary materials via a legitimate processes resulting in a final product needing to meet a rigorous specification, is no different to the manufacture of any fuel product and that therefore the output material should be considered equally as a product, while still being managed in accordance with the environmental risk determined.

Similarly, fly ash, generated in NSW is used as an SCM by the cement and concrete industry in Victoria where it is no longer classified as a Prescribed Industrial Waste by the EPA. This assisted NSW with waste management and Victoria with resource conservation, where Victoria has no suitable grade of Fly Ash for SCM use.

The draft Victorian Industrial Waste Regulations do enable reduced red tape where direct or secondary beneficial reuse is possible. Direct reuse is free of documentation but secondary requires a once off EPA approval.

In South Australia, the EPA established specific GLC for pollutants based on the WHO criteria and modelling of test data taken from the stack. These limits are written into the operating

licence of the cement works and give certainty to the industry, the EPA and the community that emissions for any changes to the process will be measured, reported and controlled to within the licence conditions.

Examples of Waste Regulatory barriers stifling industry

Blue Circle Southern Cement's Berrima Works in New South Wales has been striving to maximise its usage of alternative raw materials (ARMs). Current ARMs approved for use at the plant are BOS secondary fines, mill scale, steel slag, FCC catalyst and cement fibre board. In particular, Berrima has been focusing on achieving 100% replacement of iron ore requirements with alternative materials sourced from the steel industry.

Until recently the receipt of wastes classified as Solid or Inert was restricted to a maximum quantity of 30,000 tonnes per annum. Acceptance of tonnages beyond this limit required the site to be classified as a waste facility, which imposed unacceptable management requirements on BCSC. Recent changes to the NSW regulatory framework have included the introduction of Recovered Resource Exemptions (RREs). This process was designed to streamline the approvals process for alternative raw materials and fuels and avoid the requirement to have sites reclassified as waste facilities.

However, BCSC's experience of the RRE process has not reflected this apparent streamlining, having experienced considerable regulatory barriers to the approval of an iron replacement material termed Iron Ferrous Material (IFM) Blend, despite the fact that two of the four blend components are already approved for use at the Berrima Works. BCSC perceives that the RRE process has been beneficial only for those wastes that are very benign, such as cement fibreboard, and that the process has not resulted in the significant streamlining of approvals processes that was foreshadowed. This has had an adverse impact on Berrima's ability to maximise its use of alternative raw materials, particularly iron rich materials from the steel making industry.

In NSW the use of alternative (non-standard) fuels in the cement industry has resulted in the imposition of regulatory constraints that create a very significant barrier to their use. In 2004 BCSC applied for approval to use alternative fuels at the Berrima Works. Approval to use alternative fuels was provided but was subject to a significant tightening of the Berrima Work's operating licence when using alternative fuels. The licence requirements were based on the European Union's Waste Incineration Directive (WID) which was understood at the time to be the most stringent requirements of any jurisdiction in the world. However, the NSW regulatory authorities imposed even tighter emission limits than WID, which have caused considerable operational and compliance difficulties that have resulted in alternative fuels only being used intermittently. Emissions are also required to be monitored continuously (rather than the usual annual stack testing), requiring the purchase and maintenance of complex and expensive continuous emission monitoring systems. The full potential of the Berrima Works as an end-use option for alternative fuels is therefore not being realised and represents a considerable lost opportunity.

The NSW regulatory framework also imposes strict controls on the input quality of alternative fuels (and materials) in conjunction with strict emission limits. This approach stifles the cement industry in NSW from adopting a wider range of suitable alternative fuels and materials that could be used safely within emission limits. For example, the Berrima Works is only permitted to receive materials with a PCB concentration of less than 2ppm. Such materials are considered to be PCB-free given current analytical detection limits. However, Cement Australia is permitted to use alternative fuels with PCB concentrations of up to 50ppm. This results in a perverse sustainability outcome whereby Geocycle collects such fuels from NSW, transfers them to their Victorian plant for blending, then delivers them to their kilns in Queensland and Tasmania. The fuels are therefore transported up to 4000kms from their source in NSW to

their point of use in Queensland, when they could be safely used in NSW. The focus on both inputs and outputs creates additional barriers to resource recovery and use without providing a significant improvement in outcomes.

It can be seen that the current legislative requirements in NSW place significant limitations on the Berrima Works' ability to re-use waste materials, and stifles extended resource sustainability and the potential for the plant to further reduce its environmental footprint.

Nowhere is the issue of multiple cross border duplication more apparent than for Hazardous wastes processed by Geocycle. For example:

1. Geocycle must have a VEPA licence to receive and process hazardous and other wastes.
2. Geocycle must have approval from VEPA to declare our fuel output a non-waste.
3. The Cement Australia kilns must have a QEPA licence to use Geocycle's fuel
4. Geocycle must have a QEPA Beneficial Use permit to declare Geocycle's fuel output a non-waste.
5. Before each licence or permit is issued, the State EPAs communicate with each other to "coordinate" their approaches but still go their own way, issuing duplicating documentation and put varying, and not always compatible, controls in the various documents.
6. Some wastes further require conformance with National regulation that applies another layer of State controls, approvals and documentation eg PCBs and OCPs.

Inconsistency in State legislation creates uncertainty and confusion. Fly ash is identified as a controlled or hazardous waste in Western Australia and South Australia, yet its inert properties have encouraged its use as a SCM in cement well before it was classified as a waste. The practice of using the material in cement and concrete continues without controls that would be expected of hazardous materials, adding a risk to the use of Fly Ash that should this standard of waste management be applied to Fly Ash its broad use would stop and it would be returned to landfill (250kt per annum). This would be a disappointing outcome as NSW, Queensland and Victoria are now using Fly Ash as a regular construction material.

Appendix C – Supporting National and International Programs of resource recovery

Cement Industry Action Agenda

On the 24th August 2004, the Hon Ian Macfarlane MP launched the Cement Industry Action Agenda stating “*the Cement Industry Action Agenda is a government-business partnership that will map a future for the industry by identifying opportunities and challenges ahead.*” Through this Action Agenda industry is committed to securing a cooperative relationship with Australian, State and Territory Governments with the objective of delivering the best possible regulatory and fiscal framework for a sustainable long term future. This will allow the industry to counter anticipated international competition. Appendix D includes an extract from the Australian Cement Industry Action Agenda 2006-2012 detailing the government and industry actions in relation to waste.

State governments welcomed the findings of the Action Agenda and have been positive in their comments and suggestions on how to work through the various COAG committees to implement recommendations. One of the key Government actions in the Cement Industry Action Agenda is to develop and implement a nationally consistent approach to waste policy, addressing such issues as eco-efficiency, recycling and product stewardship.

Representations to progress these key recommendations have been made jointly by CIF and Australasian (iron & steel) Slag Association (ASA) with representatives of the Environment Protection and Heritage Council (EPHC) Waste Working Group.

Coincident with these representations, the Department of Industry Tourism and Resources (DITR) sponsored a national workshop titled “Alternative Raw Materials Use in Construction Section: Legal/Regulatory Issues” in Sydney on 4th May 2007.

The aim of the workshop was to “explore the legal/regulatory impediments having greatest potential to frustrate the current and ongoing use of alternative raw materials (ARM’s) in the manufacture of cement and concrete, a key issue identified by the Cement Industry Action Agenda (CIAA)”.

The specific objective being to “identify pathways for government and industry actions that can lead to the removal of legal or regulatory barriers for utilisation, thus increasing the uptake of alternative raw materials and supplementary cementitious materials (SCMs) such as iron and steel slags”.

Progress towards the key objective of the workshop to “identify pathways for government and industry actions that can lead to the removal of legal or regulatory barriers for utilisation...” was limited by the absence [low level of participation by] of representatives from state jurisdictions.

Some recommendations relative to key objective included;

- Only classify materials as “waste” when they ARE disposed of in landfills - otherwise cover by resource rules.
- Overall framework and policy process between states are similar, but interpretation, application and final outcomes can vary widely in practice. EPHC to take leadership role to develop national approach for reclassification
- Use of waste as a resource conserves natural resources and should be encouraged with appropriate policy.
- Environmental [landfill] levy funds should support R&D focussed on material reuse/recycling (e.g. grants)

Notes of the outcomes from this workshop are provided in Appendix D.

Productivity Commission Inquiry into waste generation and resource recovery

In 2005, the Productivity Commission was asked to advise on strategies to address market failures associated with the generation and disposal of waste. The Productivity Commission made several recommendations in relation to providing a nationally consistent approach to waste management. The Report recommended that:

- the Australian Government work with state and territory governments to develop and implement a national definition of waste, a national classification system and review the appropriate balance between prescriptive and risk-based classification of waste
- there is a need for the development and implementation of a concise nationally consistent data set for waste management
- opportunities to achieve further consistency in regulatory standards applying to waste should be explored.

World Business Council for Sustainable Development – Cement Sustainability Initiative

The Cement Sustainability Initiative (CSI) is a program of the World Business Council for Sustainable Development (WBCSD) was established in 2000 to develop and promote practical ways for the global industry to focus its sustainable development in environmental and social performance. The CSI has produced guidelines for each area of its Agenda for Action including the role of selecting and using fuels and materials in cement manufacturing.

The cement industry's contribution to sustainable development through eco-efficiency is increasing the efficiency with which we use non traditional forms of energy and material resources by sourcing, recovering and developing the use wastes and by-products from other industries ('industrial ecology'). Using resources more efficiently is an essential step toward creating a more sustainable society. Eco-efficiency means producing more with less: less waste and pollution, and fewer resources. It not only helps to break the link between economic growth and environmental degradation, but also can help companies improve financial performance.

Cement companies can achieve eco-efficiency gains in several ways, for example, **waste co-processing and energy / material recovery** – which uses the waste and by-products of other industries as fuels and raw materials for cement manufacture, creating 'closed loops' of resource use.

For some time, the industry has focused on mineral and energy recovery from the waste and by-products of other processes, a process known as 'co-processing'. Cement kilns can be used for energy recovery from non-hazardous wastes such as tyres and biomass, as well as some hazardous wastes. This reduces the need for fossil fuels and natural raw materials and increases resource efficiency. This practice also provides society with a new technology and skills, waste management options to landfill that are economically viable and environmentally sound alternative to land disposal, treatment, or incineration, the conservation of natural resources and in some cases can reduce greenhouse gas emissions.

Appendix D – Industry Action Plans

Extract from Australian Cement Industry Action Agenda

Goal 2 - *Increase electrical and fuel efficiency and reduce greenhouse emissions by 2012 in line with the goals identified in the Technology Pathway Report.*

Recommendation 2 - *Future emissions management measures continue to acknowledge the impacts on energy intensive industry.*

Industry commitments

9. Continue to reduce energy use and greenhouse gas emissions through the following strategies:

- switching to biomass as a carbon neutral alternative fuel;
- substituting calcined materials such as iron and steel slag and coal combustion products for natural raw materials such as limestone, clay and shales in the raw material mix;
- introducing more energy efficient equipment and practices;
- increasing the use of fuels with lower CO2 emission intensities; and
- extending the use and promotion of Supplementary Cementitious Materials (SCMs) in cement and concrete manufacture.

Goal 3 - *Increase the uptake of alternatives to fossil fuels, secondary materials and supplementary cementitious materials by 2012 to meet or exceed the quantities identified in the Technology Pathway Report.*

Recommendation 3 - *The Australian Government, in consultation with industry, State and Territory governments consider the scope to enhance the uptake of alternatives to fossil fuels, secondary materials and supplementary cementitious materials.*

Government actions

14. Develop and implement a nationally consistent approach to waste policy, addressing such issues as eco-efficiency, recycling and product stewardship.

15. Remove unwarranted regulatory impediments to resource recovery and reuse.

16. Australian Government to work with industry and other governments to promote the life cycle benefits of using alternative fuels and materials to the community.

Industry commitments

17. Pursue a collaborative and strategic approach to encourage the harmonisation of environmental legislation and regulations impacting the industry, including to:

- contribute submissions to the Australian and other governments;
- coordinate a submission from relevant industry associations to the Australian Government on the need for a national inventory of alternative fuels and raw materials;
- work with governments to develop product stewardship schemes; and
- develop commercial recycling schemes to:
 - encourage energy recovery from secondary materials or their reuse as raw materials; and
 - contribute to the elimination of unnecessary environmental impacts associated with current waste management practices.

18. In relation to supplementary cementitious materials (SCMs), to:

- work with relevant industry associations to identify and overcome barriers to increased uptake of SCM and, through joint representation, work to have any regulatory barriers addressed; and
- seek to increase the use of SCM in cement and concrete to at least 29 per cent by volume by 2012.

19. Work collaboratively with relevant industry associations and the Australian, State and Territory Governments to demonstrate the environmental and community benefits of the use of alternative fuels and materials by the industry to the community.

Notes from the ASA Conference May 2007, Workshop on Resource Recovery of Supplementary Cementitious Materials

Slag was recognised by speakers as a vital “co-product” of the iron and steel industry rather than merely a “waste”. Its favourable properties (strength, durability, light weight and inertness) for use as a substitute for cement in concrete, as well as within asphalt mixes for road construction are now well known in Australia and many other countries. The use of slag as a substitute for natural resources has the potential to save energy and reduce greenhouse gas emissions significantly (e.g. reduce CO₂ emissions by 7%). Other examples of slag being used as a filter and within fertilizer further demonstrate its wider potential for use in an environmentally sound manner.

In the USA, slag is commonly referred to as a “co-product” and representatives from research, industry and the EPA meet regularly to share experiences and seek ways to limit bureaucracy and restrictive legislation. The challenge given to conference participants was that leadership to champion the increased use of slag needs to come from industry rather than government to help ensure its sustainable use, and that performance based regulations will be more helpful than prescriptive approaches to regulation.

The reduction of prescribed industrial waste is a priority for EPA Victoria and the cement industry is identified as best positioned to help divert more volumes of prescribed industrial waste from landfill (particular attention was given to potential fuel materials, rather than slag).

Recognition was also given to the recently published Productivity Commission Inquiry Report, Waste Management (2006). Within this report different [state] approaches to defining, classifying and regulating wastes were found to lead to ambiguity and confusion. The processes for exempting some recyclables [ARM] from regulation were seen as unclear and inefficient. Recommendations from this report relevant to this workshop were:

- The Australian Government should work with State and Territory Governments to improve existing definitions, classifications and exemption processes for recyclables.
- Ways need to be explored to achieve greater consistency in regulatory standards for waste.

A summary of industry’s understanding of the various state jurisdictions dealing with substances such as slag is given in Table 1. It is seen in this table that currently the only legal status of slag is that of a “waste” and that a permitting function is the only way to enable effective use of the product.

State	Regulatory Waste Status	Exemptions Status	Exemption Criteria	Transport Exemption	Legal Status
Victoria	Waste	Yes Project specific Expires	Field Rule Not specified Subject to review 100 x Std drinking water req	Yes Project specific Expires Fees apply	Waste
New South Wales	Waste Lic requirements >20kts	None found	System for classification by generator - Inert, solid etc	Yes Project specific Expires Fees apply	Waste
Queensland	Waste	Yes BRA Project and resource type specific	None Application specific No thresholds Case by Case	Yes Project specific Expires Fees apply	Waste Exemption after BRA granted
South Australia	Not defined Responsibility for determination rest with generator	None identified Case by Case	None	Yes Project specific Expires Fees apply	Unclear - Waste
Western Australia	Not defined Responsibility for determination rest with generator	None identified Case by Case	None	Yes Project specific Expires Fees apply	Unclear - Waste

Table 1: Jurisdiction approaches to substances such as slag.

Further innovative approaches will be needed to gain the attention of the relevant personnel within government jurisdictions who have the power to act so that appropriate changes can be made to legislation to ensure environmental and social imperatives are met and industry is able to responsibly manage the alternative resources they have available. To this end the ASA may need to explore and champion the formation of a multi industry driven working group bringing together affected industry co-products thus giving weight to the issue and gain traction within government jurisdictions.

Appendix E – a decision tree for waste versus by-product decisions

