
**Submission on the
Draft Regional Waste Management
Plans 2015-2021**

**Connacht-Ulster Region
Eastern-Midlands Region
Southern Region**

from

Cement Manufacturers Ireland

January 2015



CEMENT MANUFACTURERS IRELAND

Cement Manufacturers Ireland was established in Ibec in 2003 and has three members in the Republic of Ireland; Irish Cement, Lagan Cement and Quinn Cement and an associate member in Northern Ireland – Lafarge Cement.

The history of cement manufacturing in Ireland dates back over 75 years. The industry has a long history of continuous investment in process and product innovation. In recent times the industry has invested over €300 million in modern manufacturing facilities and operates to the highest International and European standards.

The members of CMI support 2,000 direct and indirect jobs in Ireland. The members supply cement products to the domestic construction market and are also involved in the export of cement products to other European markets.

CMI is a member of the European Cement Association CEMBUREAU.

Executive Summary

The member companies of Cement Manufacturers Ireland (CMI) welcome the three recently published Draft Regional Waste Management Plans 2015-2021. CMI members acknowledge the extensive work carried out by the Authors of the Draft Plans in cataloguing the existing waste management infrastructure in each of the regions.

The recognition in the Draft Plans of the positive contribution to the treatment of residual waste by Ireland's cement industry is particularly welcomed by CMI members. The use of alternative fuels in cement kilns is known as co-processing and helps to reduce the industry's dependence on imported fossil fuels and delivers on many of the policy objectives contained in the Draft Plans.

Co-processing in cement kilns;

- Facilitates diversion of waste from landfill
- Provides a viable alternative to exporting waste
- Provides efficient waste recovery infrastructure
- Produces no ash residues – minerals become part of the clinker product
- Reduces dependence on imported fossil fuels
- Directly reduces carbon dioxide emissions

The replacement of fossil fuels with alternative fuels derived from residual resources is a long-term strategic objective for the cement industry in Ireland. Over 30% of the fossil fuels have already been replaced, and CMI members have

made a commitment to achieve 50% fossil fuel replacement by 2017. With current regulatory approval for approximately 340,000 tonnes of alternative fuels, Ireland's cement industry will become the largest industrial user of 'waste derived' alternative fuels in the coming years.

Currently three cement kilns are actively using alternative fuels in Ireland. In 2014, 175,000 tonnes of alternative fuels were used by CMI members.

CMI is pleased to have the opportunity to comment on the Draft Regional Waste Management Plans, and in this short document provides clarification of the current and future contributions co-processing in the cement industry can make to residual waste treatment in Ireland and how it directly supports many of the key policy objectives of the Plans.

CMI members would encourage the Authors to strengthen the recognition for co-processing in the final versions of the Plans and to formally recognise the superior aspects of co-processing based on the high operating temperatures, high energy efficiency and absence of residues.

The Regional Waste Plans provide an excellent opportunity to take advantage of the growing capacity of Ireland's indigenous cement industry to efficiently use residual waste as fuel both immediately and as part of long-term sustainable national and regional waste management strategies.

1. Introduction

The members of CMI do not operate in the waste sector. The cement industry is a manufacturing industry licenced by the Environmental Protection Agency (EPA) that has in recent years begun sourcing waste-derived fuels from operators in the waste sector.

CMI members have cement manufacturing facilities across the three Regional Waste Management areas. Having reviewed all three Draft Plans, CMI has chosen to submit a single response to all three Waste Regions.

The Draft Regional Waste Management Plans cover a vast array of waste management topics from 'enforcement' and 'regulation' to 'finances' and 'investment'. CMI has confined its observations and commentary to sections of the Plans relevant to co-processing waste in the cement industry.

The Authors of the Draft Regional Waste Management Plans have put significant effort into the collection and analysis of waste data, treatment options, future projections and the development of detailed waste policies. The reduction of the regional authorities to three and the cooperation across regions is to be welcomed as many of the waste challenges facing Ireland will require a national approach.

2. The Cement Industry and the Regional Waste Management Plans

The Draft Plans recognise **sustainability** and **self-sufficiency** as key challenges for managing waste throughout Ireland and reference the European Commission 2010 publication *Europe 2020*¹, the growth strategy for the decade from 2010 which challenges Member States to become smart, sustainable and inclusive economies. Also referenced in the Draft Plans is the more recent, July 2014, European Commission communication *Towards a Circular Economy: a zero waste programme for Europe*². This points for the need for Member States to be more resource efficient and transition to a circular economy.

The Draft Plans set out a clear **Strategic Vision and Approach**.

“The strategic vision of the regional waste management plan is to rethink our approach to managing waste, by viewing our waste streams as valuable material resources leading to a healthier environment and sustainable commercial opportunities for our economy.”

The Plans also recognise the vital role the *‘waste and resource management sector’* has to play in helping Ireland transition to a more resource efficient, circular economy.

CMI members operate in the resource management sector. The three cement companies transform local raw materials into high quality cement clinker within the cement kilns.

The clinker, an intermediate product is then milled on-site to produce cement products. The companies are continuously investing and developing initiatives to improve the efficiency of primary and secondary raw material usage. In addition, and more specifically in relation to waste management, CMI members have invested in systems to replace imported fossil fuels with alternative fuels produced from local residual wastes. These initiatives deliver multiple benefits;

- **Diverting waste from landfill.**
- Providing a residual waste treatment solution **with no ash residues.**
- **Reducing carbon emissions**, through the substitution of fossil fuels with lower carbon alternative fuels.
- **Enhancing energy security** through the displacement of imported fuel with indigenous, locally produced fuel.
- **Supporting long-term local employment** in indigenous fuel production as well as the existing cement industry.

CMI members, in partnership with the waste sector, have recognised the resource value of what was previously considered waste, and working together have channelled these discarded resources to enhance environmental and business performance. Over the next few years in Ireland, the cement industry will become the largest user of these residual materials. The industry is committed to growing the use of locally sourced alternative fuels. In 2014 over 30% of fossil fuels were replaced by alternative fuels and CMI has committed to achieving 50% replacement by the end of 2017 (figure 1).

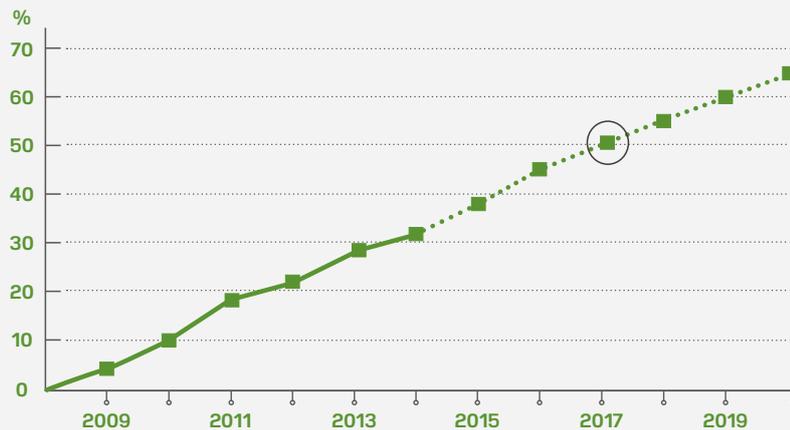


Figure 1: The graph shows the growth in the replacement of fossil fuels with alternative fuels by CMI members to date and the planned replacement rate to 2020.

Not only is this growth in alternative fuels use good for business, it also delivers wider community and sustainability benefits and supports many of the policy objectives set out in the Draft Plans.

In summary, the cement industry can make a significant contribution to the achievement of the strategic vision in the Regional Waste Management Plans.

¹ http://ec.europa.eu/europe2020/index_en.htm

² <http://cor.europa.eu/en/activities/stakeholders/Documents/COM%282014%29%20398%20final.pdf>

3. Co-processing – Unique to the Cement Industry

For more than 30 years the cement industry in Europe has contributed to the **circular economy**, through its recovery and reuse of discarded resources as alternative fuels. The use of alternative fuels, known as ‘**co-processing**’ is the **simultaneous recycling of materials and recovery of energy** from residual wastes which would otherwise require disposal.

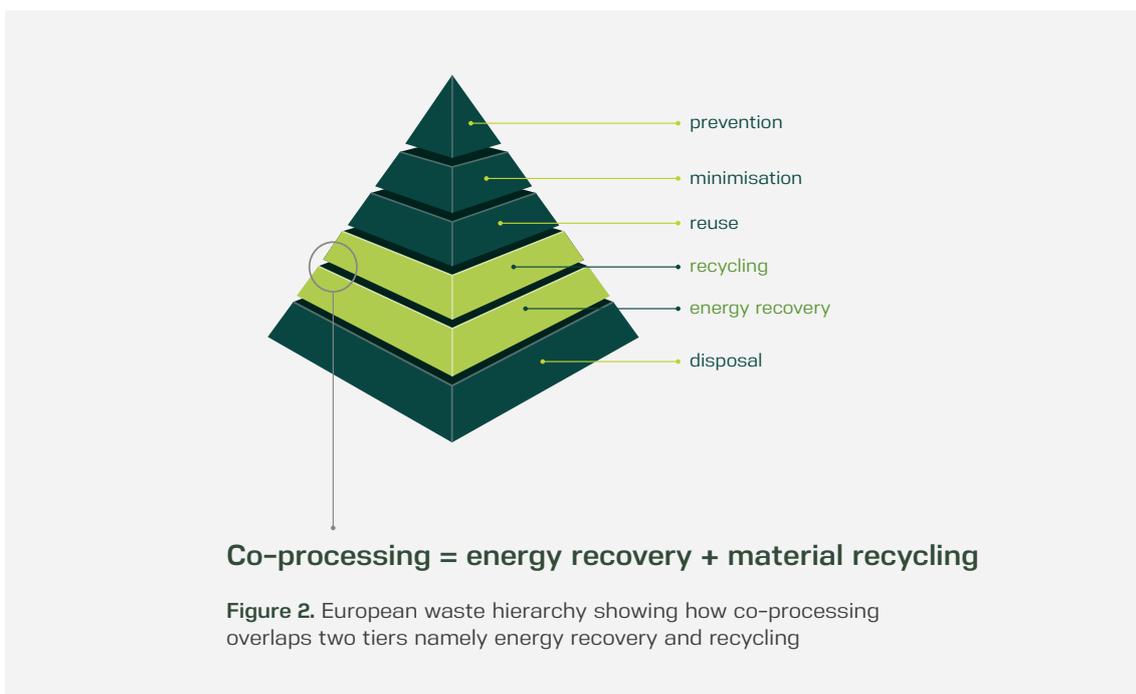
Not only do these alternative fuels provide **energy** for the cement kiln, they **also** contribute **raw materials** to the process; a recycling element that is unique to the cement industry.

Co-processing is unique because it overlaps both the energy recovery and material recycling tiers on the EU waste hierarchy (figure 2). Energy is recovered **and** the fuel ashes are fully consumed to become part of the cement clinker, simultaneously inside the cement kiln.

Co-processing is a “win: win” outcome, not only does it contribute to improved resource efficiency, through reducing the use of primary resources, including fossil fuels, it also directly reduces the need for disposal options like landfill. In this way co-processing in the cement industry fulfils key policy objectives of the European Commission which are also reflected in the Draft Plans;

- **recycling of discarded resources**
- **diversion from landfill**
- **energy recovery**

Co-processing provides a solution for the resource efficiency and circular economy policy objectives in the Draft Plans and supports recycling activities by providing secure outlets for residual or contaminated materials.



Work currently underway in Portugal is providing empirical evidence of the contribution of co-processing to the achievement of national recycling targets. A series of tools to determine the 'Recycling Index' for a variety of alternative fuels has been developed.

In many European countries the cement industry is considered an essential component of national waste infrastructure, enhancing resource recovery and recycling. In Switzerland, Germany and Sweden the local cement industry has actively contributed to the achievement of zero or near-zero landfill rates. Now in Ireland too, CMI members are helping to achieve a modern efficient waste management system for the country.

In 2012 the cement industry in Europe replaced an average of 34% of its fossil fuels with alternative fuels. In Switzerland the figure was 52.5%³ in 2012 and in Germany the figure was 62.5%⁴ for 2013. Verein Deutscher Zementwerke e.V. (VDZ), the German Cement Works Association in their 2013 report provides details of the range of different alternative fuels used in Germany. The list includes tyres, oil, solvents, meat and bonemeal, sewage sludge, solid recovered fuel (SRF) and wood.

Solid Recovered Fuel – SRF

CMI members have regulatory approval to use 340,000 tonnes of alternative fuels from a range of types that includes SRF, tyres, meat and bonemeal and solvents. Of these, SRF is the most common alternative fuel. SRF is a shredded mixture of paper, plastics and fabrics derived from residual waste. In partnership with the waste industry the residual waste, which remains after the valuable recyclables

have been removed, is processed to an agreed specification. The SRF is delivered to the cement kilns as a 'ready to use' fuel. The SRF is subjected to quality control procedures to ensure it meets the required specification and is then fired in the kilns.

Quality Control

Carefully controlling the mineral balance inside the kiln is essential for the manufacture of high quality cement clinker. Large quantities of raw materials are used in the clinker manufacturing process and they are subjected to rigorous round the clock testing. Similarly, frequent sampling and testing of the alternative fuels is a feature of modern cement production. Significant investments have been made by both the cement and waste industries in the production, quality control and use of alternative fuel. Close cooperation with fuel suppliers helps to monitor the consistency and quality of the alternative fuels.

Safe and Efficient

Gas temperatures at the main burner inside cement kilns exceed 2,000°C. These temperatures are required to 'melt' the crushed rocks used as raw materials. The fuels used to fuel cement kilns are fully consumed due to these high temperatures and long residence times (the time that the gases and materials are subjected to elevated temperatures). Fuels are only used when the kilns are manufacturing cement clinker. The kilns are highly efficient at capturing and reusing the energy from the fuels, as well as ensuring that the mineral fractions of the fuels become an inherent part of the resulting cement clinker.

³ Cemsuisse; <http://www.cemsuisse.ch/cemsuisse/produktion/brennstoffe/index.html?lang=de>

⁴ VDZ, Environmental data of the German Cement Industry; <http://www.vdz-online.de/en/publications/environmental-data>

4. Co-processing and Thermal Treatment

The Draft Plans include the following statement outlining preferred support for Thermal Treatment;

“The local authorities of the region support self-sufficiency and the development of indigenous infrastructure for the thermal recovery of residual municipal waste in response to legislative and policy requirements. The preference is to support the development of competitive environmentally and energy-efficient treatment facilities in Ireland and ultimately minimise the exporting of residual municipal waste resources of the plan period. Whilst there is the potential for local impact on the environment from the development of indigenous infrastructure there are overall positive effects resulting from the reduction in national and international transport of waste streams and associated emissions in working towards self-sufficiency.”

The cement industry in Ireland is largely self-sufficient with over 95% of its raw materials sourced locally in Ireland. With no indigenous sources of fossil fuel the cement industry in Ireland has a great opportunity to further improve the self-sufficiency and resilience of this local industry by continuing to develop the use of locally available alternative fuels.

The use of alternative fuels is becoming a new standard for cement kilns throughout Europe. Over the next three years so called ‘alternative fuels’ will overtake fossil fuels in Ireland as the primary contributor of energy to the cement clinker manufacturing process.

CMI members welcome the statement in the Draft Plans *“preference is to support the development of competitive environmentally and energy-efficient treatment facilities in Ireland”*. The cement industry in Ireland fits the description **competitive environmentally and energy-efficient**. With the pre-existing infrastructure in place the industry has partnered with the waste sector and developed systems to extract the value from discarded resources to the benefit of both business

and the wider community. These significant developments have been largely achieved without external support and CMI members request that the continued development of **co-processing** in Ireland is not jeopardised by future market or regulatory distortions.

CMI members are directly assisting the Authorities with their thermal treatment ambitions as set out in the Draft Plans;

- The cement industry has invested in **installed indigenous infrastructure**
- The cement industry is already operating successfully in a **competitive market** for access to these alternative fuels
- The cement industry’s use of **waste resources as fuel** provides an efficient alternative to waste exports and landfill
- The cement industry delivers a **double benefit**, manufacturing an essential commodity for our modern economy while also performing a waste recovery service
- Co-processing of residual waste **reduces potential environmental impacts** associated with alternative options

5. Co-processing a Superior Energy Recovery Option

“Ireland’s resource efficiency and productivity needs to be improved – more value needs to be extracted from the resources we use and currently discard.”

The cement industry is one of the most energy efficient industrial users of fuel. The reason for this superior energy efficiency is quite simple; modern cement production facilities such as those operated by CMI members in Ireland, use direct heat and function as large heat exchangers, maximising the heat transfer from the fuels to the raw materials. Efficiencies of greater than 70% are typical^{5,6}. This is in contrast to an efficiency of 24.2% for a waste to energy plant generating only electricity⁷.

Papageorgiou et al, 2009⁸ cite evidence in England that production of SRF followed by displacement of fossil fuels in cement kilns is the most advantageous energy recovery option for municipal waste. The International Waste Policy Review⁹ on behalf of the Department of Environment Heritage and Local Government in 2009 confirmed the superiority of cement kilns as a treatment option for SRF derived from residual wastes in Ireland.

The UK Department of Environment, Farming and Rural Affairs (DEFRA) in their June 2011 publications, *Applying the Waste Hierarchy: evidence summary*¹⁰ and *Guidance on applying the Waste Hierarchy*¹¹ begin to address the question – *to what degree should waste policy distinguish between different forms of recovery?* The DEFRA documents identify cement kilns as **a superior energy recovery option** for tyres and residual ‘black bag’ wastes.

The production and use of SRF is an excellent example of highly efficient resource recovery in practice. In the past the resource value of this material was either lost through export or landfilling, but now through an active partnership between the cement and waste management sectors the value of these resources can be fully recovered here in Ireland.

Thermally the cement kiln is extremely efficient at maximising heat recovery from the use of fuels. In addition, ash production associated with other energy recovery technologies, is avoided in a cement kiln as the mineral components of the fuels are incorporated into the cement clinker, a unique **recycling advantage of co-processing** in the cement industry.

Based on these principle advantages the cement kilns extract a higher proportion of the resource value from each tonne of waste than other thermal recovery options. With balanced and considered regulations the cement industry will continue to provide an environmentally superior resource recovery service in all three of Ireland’s Waste Regions.

⁵ Different Possible Ways for Saving Energy in the Cement Production Aly Moustafa Radwan. Advances in Applied Science Research, 2012, 3 (2):1162-1174

⁶ Japanese Cement Association; http://jcassoc.or.jp/cement/2eng/e_01a.html

⁷ SEPA Guidance for Developers; http://www.sepa.org.uk/waste/waste_regulation/guidance__position_statements.aspx

⁸ Papageorgiou, A., Barton, J.R. and Karagiannidis (2009): Assessment of the greenhouse effect impact of technologies used for energy recovery from municipal waste: A case for England, Journal of environmental management Volume 90, Issue 10, Pages 2999-3012

⁹ <http://www.environ.ie/en/Environment/Waste/ReviewofWasteManagementPolicy/>

¹⁰ <http://www.defra.gov.uk/publications/2011/06/15/pb13529-waste-hierarchy-summary/>

¹¹ <http://www.defra.gov.uk/publications/2011/06/15/pb13530-waste-hierarchy-guidance/>

6. Co-processing and Contingent Capacity

“The waste plan recognises the need for ongoing disposal capacity to be available in response to events which pose a health risk to citizens, livestock and the environment and the lead authorities of each region will monitor available contingent capacity annually.”

The inherent benefits of the cement manufacturing process, high temperatures, long residence time, alkali conditions and recycling of the inorganic fractions ensure safe processing of waste. These advantages have resulted in cement kilns being requisitioned in the past to provide safe disposal infrastructure for health risk events. Meat and Bonemeal has been safely disposed for many years using local cement kilns in a number of European countries. Contaminated animal feed which was discovered in Belgium in 1999 was sent to local Belgian cement kilns at the request of the Belgian Authorities.

The main challenge in Ireland, in the event of a future health risk event, is that the licence conditions for the cement kilns may need to be addressed to allow the kilns to play an active role. Under normal circumstances the licence review process can be time consuming. The cooperation of the EPA may be necessary in such a future event to facilitate appropriate licence alteration in the event that specific permission is required.

CMI members would be prepared to cooperate with the relevant lead Authorities as part of their annual reviews of contingent capacity.

7. Conclusion

CMI welcomes the Draft Regional Waste Management Plans and is pleased to see the positive contribution of the cement sector reflected in the Draft Plans. CMI is also pleased to have this opportunity to raise awareness of the willingness of Ireland's cement industry to work with the waste sector, Regulators and Government Agencies to be part of an appropriate integrated waste management infrastructure for Ireland's current and future waste management challenges.

The members of CMI are eager to participate in future policy development and remain available to the Authors for further discussions as the Final Plans evolve.

As outlined in the Draft Plans, CMI members are already contributing to a better performing waste management sector in Ireland. The cement industry is not solely responsible for these improvements. It has operated in **partnership** with the waste sector to grow the use of alternative fuels. While a wide range of materials are suitable for recovery and reuse in cement kilns, other technologies and facilities are necessary to have a fully integrated waste management system capable of treating all of the waste types that arise in Ireland annually. The members of CMI are committed to playing an active role in the development of a **resource efficient** and **self-sufficient** waste management system for Ireland.

CMI members used **175,000** tonnes of alternative fuels in 2014. This quantity is set to double over the coming years as part of a long-term programme to improve the sustainability of cement production in Ireland. The use of these **local fuels**, improves the sustainability and self-sufficiency of the cement plants and helps to secure **long-term local employment**.

Co-processing in cement kilns in Ireland improves the self-sufficiency and sustainability of the cement plants and will **ensure the availability** of efficient treatment options for residual wastes into the future.

The opportunity exists to formally recognise the **recycling element of co-processing** in the achievement of national recycling targets.

Future waste policy objectives and regulations must ensure a level playing field for all technologies to ensure Ireland makes a real transition to a circular economy and maximises the opportunities to achieve national recovery and recycling targets.

8. Recommendations

The final Waste Plans will undoubtedly focus on shifting wastes up the Waste Hierarchy away from disposal, on minimizing landfill/export and **maximising local resource recovery**. The cement industry endorses this approach.

The displacement of fossil fuels in cement kilns with alternative fuels provides the highest level of energy recovery here in Ireland. CMI members would urge the Authors to ensure that the Final Plans formally recognise **co-processing** and the additional environmental advantages for the treatment of residual wastes in Ireland.

Co-processing provides more than just a thermal recovery option. The simultaneous recycling of the mineral fractions means no further ash is produced - a unique feature. Formal recognition of the **superiority of co-processing** in the Final Plans would demonstrate a clear understanding by the Authors of how best to maximise the value available from Ireland's residual waste resources.

Cement Manufacturers Ireland
Ibec
Confederation House
84-86 Lower Baggot Street
Dublin 2

T +353 (0)1 605 1500
E cement@ibec.ie
W www.cement.ie
