

Irish Cement - Limerick

Investing in our future



irish cement -
limerick

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future





introduction

did you know?

Concrete

is the second most consumed substance on the planet after water. Cement as the main constituent of concrete contributes significantly to the quality and sustainability of our built environment.

With new technology coming on-line and new programmes to address both carbon emissions and reduce our dependence on imported fuels, the future for cement manufacturing at Limerick is secured.

Since 1938, Irish Cement has been continually upgrading our plant in Limerick. Our current investment programme includes ultra modern fabric filters which will improve our environmental performance, putting Limerick among the top performing cement plants in Europe.

In light of the global climate change challenge, we have already introduced 'lower carbon' Cem II

cements and we are currently beginning an alternative fuels programme which will allow us to further reduce our CO₂ emissions and decrease our dependence on imported fossil fuels. This programme of swapping a portion of our fossil fuels for specified alternative fuels will bring us into line with our European neighbours, where the practice is common, and will ensure the continued competitiveness of the Limerick site.

cement production

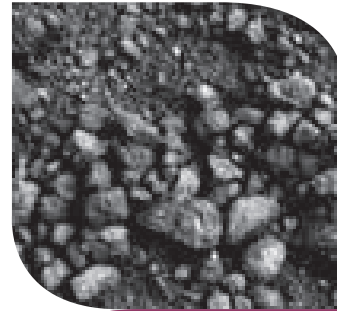
a precisely controlled chemical reaction

raw materials

1



Limestone quarried on-site is the main raw material. Silica and alumina bearing shale, pulverized fuel ash (PFA) from Moneypoint power station and iron ore, are also used. The raw materials are crushed, ground and homogenised to produce a 'raw meal' which is fed to the kiln.



fuel

2

The primary fuel in Limerick is petroleum coke (petcoke) which is imported to Ireland. The petcoke is dried and milled before being fired in the kiln. With the alternative fuels programme, other materials from Ireland will be used as support fuels and will thereby reduce our reliance on imported fossil fuels and our carbon emissions.

quality control

3



Quality control is critical to the whole cement manufacturing process. Irish Cement operates to the international quality standard ISO 9001. Our laboratory operates a continuous testing regime linked to a state-of-the-art central control room.



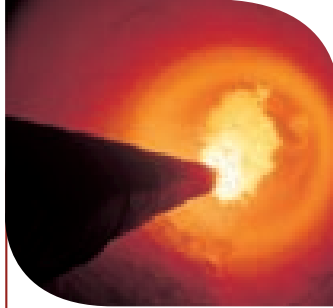
chemistry

4

The creation of cement clinker inside the kiln is the result of a precise set of chemical reactions. The compounds required are calcium oxide (CaO), silicon dioxide (SiO₂), aluminium oxide (Al₂O₃) and iron oxide (Fe₂O₃) which are all fused at the high temperatures in the kiln to produce clinker.

temperature

5



The temperature of the molten minerals in the kiln exceeds 1450°C. Air sucked into the kiln to provide oxygen for the combustion process reaches over 2000°C. These temperatures are necessary for the formation of the clinker.



clinker

6

The clinker is created by the fusion of all the raw materials into complex chemical structures which are the basic building blocks of cement. The clinker is cooled as it exits the kiln, and is then stored on-site in dedicated steel silos.

cement

7



Cement is produced by milling the clinker to a fine powder with the addition of small quantities of gypsum to control the setting time. In producing Cem II cement, unburnt limestone and PFA are also added to reduce the carbon footprint of the cement. The cements are conveyed to silos for dispatch or packed into 25kg bags.

farming

Irish Cement's Cooper Hill Farm, on the land surrounding the cement factory, is home to a herd of 850 pedigree Holstein cattle. This award winning Cooper Hill herd produces consistently high milk yields and is milked in a computer controlled automated milking parlour which is one of the most modern units in Ireland.



wildlife

Irish Cement is proud of its contribution to local biodiversity. The area surrounding the factory in Limerick provides a diverse habitat for a range of animals and plants, from nesting sites in the summer for birds of prey, to feeding areas for over-wintering geese. Parts of the man-made Bunlicky Lake provide an undisturbed area for roosting cormorants.





New fabric filters will replace the older technology on-site and will ensure that the Limerick plant performs to the best international standards.



Planned investments will minimise fine particulate emissions from the cooled exhaust gases and from the cement mills. The new systems being installed use specialized fabrics to remove the dust particles. Regular pulses of high pressure air clear the fabric surfaces to ensure optimal performance. This new technology will improve dust collection efficiency by approximately 80%. The captured cement dust will be returned to the process to be fully recycled.

**investments
for the future
- fabric filters**

did you know?

Cem II Cement

produced in Limerick uses unburnt limestone, ground with the clinker and PFA to reduce the carbon footprint of the final cement product.

investments for the future - alternative fuels



Under the Kyoto Protocol, European governments have agreed a target of reducing European CO₂ emissions by 2012 to 8% below 1990 levels. Ireland has its own demanding 2012 target which looks set to be made even more challenging for 2020.

In line with European trends, Irish Cement Limerick is applying for approval from Limerick County Council and the Environment Protection Agency to introduce a selected number of specified alternative fuels to reduce our dependence on imported petcoke and our carbon footprint.

Among our European neighbours, around 20% of the heat input required to produce cement is derived from alternative fuels. In some countries, like Switzerland, Germany and Holland over 50% substitution of fossil fuel occurs in the cement industry.

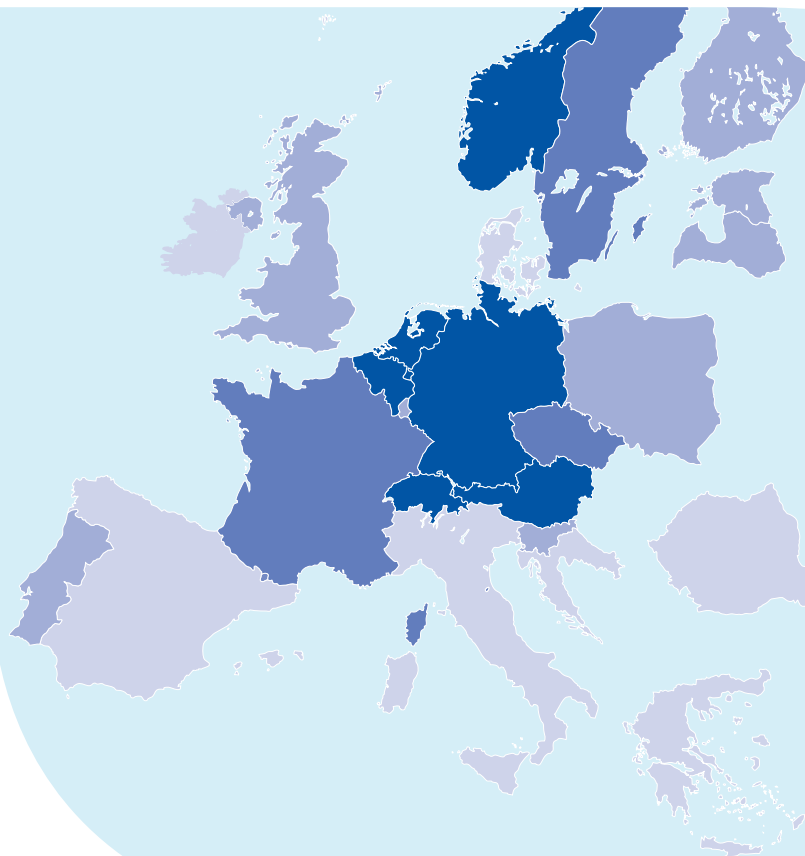
Cement kilns

- **extremely efficient** at capturing energy from alternative fuels
- high temperatures and long residence times ensure **complete combustion**
- **no residual wastes** are produced
- the alkaline composition provides an excellent **cleaning** environment for the exhaust gases

Alternative fuels

- **reduce** our **dependence** on imported fossil fuel
- directly **reduce CO₂ emissions**
- indirectly reduce national CO₂ emissions by avoiding the need for **landfill or thermal treatment** elsewhere
- **conserve** valuable **resources**

alternative fuels in europe



This map shows the extent of alternative fuel usage in the European cement industry. The darker the colour, the higher the proportion of alternative fuel use.

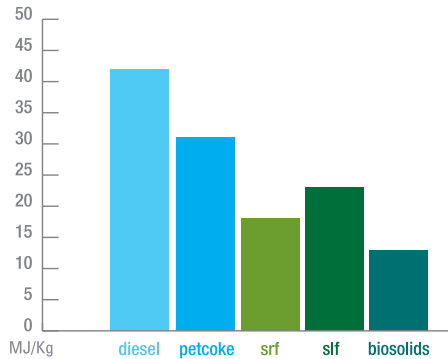
did you know?

Alternative fuels in Europe

20% of the heat required in EU cement kilns comes from alternative fuels. In some countries the figure exceeds 50%.

fuels at limerick

traditional



Diesel is one of the products refined from crude oil and is commonly used as a fuel. Only small quantities of diesel are used in Limerick for pre-heating the kiln.

Calorific value 42MJ/kg

Petcoke is a by-product of the oil refining industry. The residues are 'coked' under high pressure and temperature to produce a hard black material similar to coal. It is imported by ship, delivered in trucks and milled on site before being used.

Calorific value 31MJ/kg

calorific value

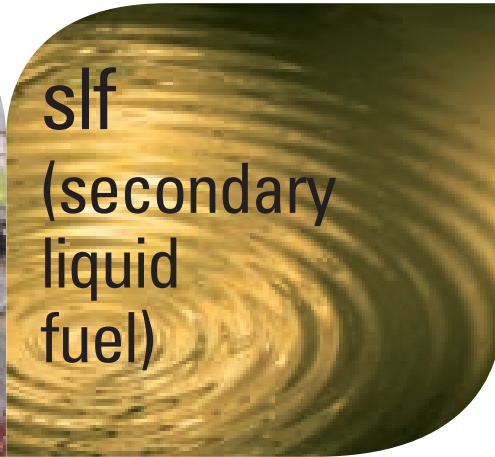
is a measure of the energy value in a material.

alternative



SRF (solid recovered fuel) is the clean dry blend of fragments of plastics, paper, cardboard and textiles, which are segregated following mechanical and biological treatment of waste materials. This fuel is produced to defined chemical and physical standards specifically for the cement industry.

Calorific value 18MJ/kg



SLF (secondary liquid fuel) is a blend of used solvents produced in Ireland by EPA licensed facilities. The solvents are tested for compatibility before being blended into a homogenous liquid fuel, which will be delivered to Limerick in sealed tankers. This fuel is produced to defined chemical and physical standards specifically for the cement industry.

Calorific value 23MJ/kg



Biosolids are the solid pellets produced following treatment of waste water in modern treatment plants such as the Limerick waste water treatment plant, located adjacent to the cement works. The dried sterilized pellets will be delivered in sealed tankers to the site in Limerick.

Calorific value 13MJ/kg

All the alternative fuels will be required to meet strict specifications and will be processed and ready for use when delivered to site. Irish Cement will carry out testing on materials delivered to Limerick to ensure compliance with specification.

health & safety



did you know?

Safety

As part of our corporate safety initiative 'CRH Simon Safety Challenge' over €770,000 has been contributed to date to the Simon Community by Irish Cement and its sister companies.

The health and wellbeing of our employees and neighbours is a primary concern for Irish Cement and has been since we commenced operations in Limerick 70 years ago. All operations in Limerick must be carried out in full compliance with our Irish Cement safety procedures. Many of our key management team are involved in European best-practice safety groups.

When alternative fuels were first introduced to European cement plants, local communities naturally had questions, particularly in relation to emissions and traffic. These concerns were addressed by engaging in open dialogue and by providing information about the fuels, the technology and controls in place. Furthermore, the successful use of alternative fuels over time has contributed to confidence among communities in their use. We are now fortunate to have many studies over the past 30 years showing that there are no increases in emissions from cement plants using alternative fuels. Additionally, we have undertaken a detailed traffic analysis showing no significant impacts on any local roads near Limerick.

The three fuels for which we are seeking approval will be processed to Irish Cement's strict specifications before arriving on-site. The combustion process required to manufacture cement is a highly controlled process. Both the temperature and residence time in our kiln system go beyond what is required under current EU regulations for co-firing these fuels.

With the best available technologies installed at Limerick, together with the considerable positive experience of alternative fuels from our sister plants in Europe, we are confident that harnessing the energy value of these fuels and reducing our dependence on imported fossil fuels positively contributes to the environment. We also believe that these benefits ensure the future sustainable development of Limerick in the interests of our employees and the local community.

Limerick operates under an Integrated Pollution Control (IPC) licence from the EPA and all emissions are strictly controlled. This licence is currently being upgraded to an Integrated Pollution Prevention Control (IPPC) licence by the EPA and this will be reviewed before introducing the alternative fuels. The plant also operates to the international environmental management standard ISO 14,001.

Irish Cement Limerick is committed to sustainable cement production. In line with CRH's commitment to achieving 15% CO₂ emission reductions by 2015, Irish Cement is working on projects designed to deliver significant CO₂ emission reductions and environmental improvements:

- Cem II 'green' cement is produced with the addition of unburnt limestone and PFA.
- Alternative fuels will reduce our dependence on imported fossil fuels and reduce our CO₂ emissions.
- The Limerick kiln will efficiently recover the energy from materials currently landfilled at home or exported as fuel to other countries.
- The new fabric filters will bring Limerick into line with world class emission control standards.



the
environment

summary of key points

Limerick

- Irish Cement's plant was commissioned in Limerick in 1938.
- Limerick was upgraded in 1983 when the modern dry process plant was commissioned.
- The plant has operated under an environmental licence from the EPA since 1996.

Technology

- Ultra modern fabric filters will put Limerick among the best performing plants in Europe.
- The new filtration technology, will improve the plants dust collection efficiency by more than 80%.
- Temperatures and residence times of the kiln system greatly surpass EU requirements for alternative fuel use.

Cem II

- Cem II cement is a lower carbon cement and was first introduced at Limerick in 2007.
- The addition of unburnt limestone reduces the clinker content required to produce the cement and the carbon footprint of the cement.
- PFA from ESB Moneypoint is recycled in Limerick as a low carbon ingredient in all our cements.

Alternative fuels

- Reduce the need to import fossil fuels.
- Directly reduce CO₂ emissions.
- Indirectly reduce CO₂ emissions by avoiding landfill and thermal treatment elsewhere.

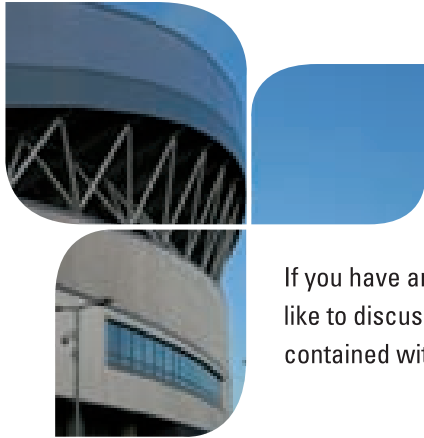
Local perspective

- There will be no significant increase in traffic with this alternative fuels programme.
- No change in emissions from Limerick when alternative fuels are used.
- No residual waste is produced in the cement making process.



Europe

- Alternative fuels have been in use for over 30 years in Europe.
- 20% of the heat input to EU cement kilns already comes from alternative fuels.
- Many EU countries have substituted over 50% of their fossil fuels with alternative fuels.



If you have any questions or would like to discuss any of the information contained within, please contact us.



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