

IRISH CEMENT PLATIN INVESTING IN OUR FUTURE



INTRODUCTION

Investing in our future. The next phase.



The next phase of investment in Platin will see further energy efficiency improvements through on site electricity generation and reduced dependence on fossil fuels through advances in the range and quantity of alternative fuels. Continuous investment in new technology has been the hallmark of Irish Cement's operations since the opening of the plant in Drogheda in 1938. In 1972, a new dry process plant Kiln1 was constructed when operations transferred to the current site in Platin. A major upgrade was completed with the addition of Kiln 2 in 1977 and then again in 2008 with the construction of Kiln 3, making Platin one of the most energy efficient cement plants in Europe.

These investments have been vitally important in helping Platin to maintain efficiency and sustain local jobs during the recent period of reduced domestic demand. Our highly efficient operations in Platin put us in a good position to compete for export markets in the UK and Europe.





- **1.** Energy efficiency investments
- **2.** Product innovation
- **3.** Fossil fuel replacement

CEMENT PRODUCTION

A precisely controlled, high temperature manufacturing process. Safety is of critical concern through all stages of the process.



RAW MATERIALS

Limestone, quarried on site, is the main raw material. Clay overburden, also from the site, with shale and small quantities of bauxite and iron ore are also required. These raw materials are crushed, ground and homogenised to produce a blend called 'raw meal'. This raw meal is then 'melted' inside the cement kiln.





FUEL

Traditionally fossil fuels are used to fire cement kilns. Since 2011 an increasing proportion of the fossil fuels have been replaced by Solid Recovered Fuel (SRF). The fuels are combusted at both ends of the kiln to provide the high temperatures needed to 'melt' the raw materials.





QUALITY CONTROL

Quality control is critical to each stage of the cement manufacturing process. Our laboratories, which are linked to a state-of-the-art central control room, operate continuous testing regimes for raw materials, fuel and our final products. Platin also has an R&D laboratory on site involved in product development.



CHEMISTRY

The creation of cement clinker inside the kiln is the result of a precise set of chemical reactions. The raw materials provide the following essential compounds: calcium oxide (CaO), silicon dioxide (SiO₂), aluminium oxide (Al₂O₃) and iron oxide (Fe₂O₃). At high temperatures inside the kiln, they are broken down and then combine to form new clinker minerals.



TEMPERATURE

The temperature required for clinker formation is 1450°C. Large fans draw air into the kiln providing oxygen for the controlled combustion of the fuels. The raw materials 'melt' at these temperatures allowing chemical reactions to take place and clinker to form.

CLINKER

The clinker is cooled from 1450°C to 120°C as it exits the kiln and it is then stored on site in dedicated silos. The hot air from the clinker is used to dry and preheat the raw materials and soon, in a new project, excess heat in Platin will be used to generate electricity on site.





CEMENT

Cement is produced by milling the clinker to a fine powder with the addition of small quantities of gypsum to control the setting time. Eco-efficient CEM II cement is produced with the addition of unburnt limestone, reducing the energy requirement and carbon footprint of the cement. The finished cements are conveyed to silos for dispatch by tanker or packed into 25kg bags.

WASTE HEAT RECOVERY

An energy efficiency investment.

An exciting new development in Platin will make use of excess heat from the process to generate up to 7.5 Megawatts (MW) of electricity on site. This is equivalent to around 25% of the electricity needs of plant. This project will reduce annual CO₂ emissions in Platin. There will be no change to the quantity or nature of the emissions discharged, other than they will be at a lower temperature because the heat contained in the gases will be used to generate electricity. In effect, existing hot gases from the process will be diverted through a heat exchanger or boiler, to generate steam that, in turn, drives a turbine to generate electricity. The 'cooled' gases will be filtered as normal before being discharged through the stack.

Platin will be the first cement plant in Ireland and among the first in Europe to install this type of technology. The benefits are that Platin will need less electricity from the grid, will make better use of existing heat and will improve competitiveness, helping to secure operations into the future.

PLATIN WILL USE LESS ELECTRICITY FROM THE GRID

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REDUCTION OF ANNUAL CO₂ EMISSIONS

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CO-PROCESSING

Our contribution to the circular economy.

Since 2011, Irish Cement has contributed to the circular economy through its recovery and reuse of discarded resources. The use of alternative fuels, known as 'co-processing', involves the recycling of materials and recovery of energy: two processes happening in parallel inside the kiln. Co-processing is a "win-win", it contributes to improved resource efficiency, by reducing the use of primary resources including fossil fuels and it also directly reduces the need for traditional disposal options like landfill.

In 2012, the average fossil fuel replacement rate around Europe was 36% with some countries at much higher levels. In Germany, for example, the average replacement rate is 62% and some of the cement plants have replaced 100% of their fossil fuels. The types of alternative fuels used in Germany includes tyres, oil, paper pulp, plastics, animal meal, SRF/RDF, wood, solvents, sewage sludge. In 2011, Platin began replacing its fossil fuels with SRF and by 2014 had achieved 50% replacement. With the appropriate planning and licensing, a realistic target for Platin is to achieve 85% fossil fuel replacement. Many of the same alternative fuels used around Europe like tyres, solvents and sewage sludge are also available locally in Ireland. Irish Cement is now planning a phased programme of additional alternative fuel introductions in Kiln 2 and Kiln 3 to build on the success achieved to date and to further enhance the sustainability of the operations in Platin.

In many European countries, cement plants are considered to be essential components

of national waste management infrastructure, enhancing recovery and recycling. In Switzerland, Germany and Sweden, the local cement industries are actively contributing to the achievement of high recycling rates, high energy recovery rates and zero or near-zero landfill rates.

In Ireland, the three Regional Waste Management Plans, published in 2015, for the first time recognise the important role of cement plants like Platin for the efficient recovery of residual waste.



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FUELS AT PLATIN



Existing Fossil Fuels



PETCOKE

Petcoke (petroleum coke) is a byproduct of the oil refining industry. This is currently the main fossil fuel used in Platin. It is imported by ship, delivered in trucks, milled and dried on site before being used. Calorific value 31MJ/kg.



COAL

Coal has been used in the past when it was sourced from a range of overseas locations. It was imported by ship, delivered to site in trucks, milled and dried before being used. Calorific value 24MJ/kg.

Existing Permitted Alternative Fuels



SRF

SRF (Solid Recovered Fuel) is produced locally to a defined specification and contains fragments of plastics, paper, cardboard and textiles produced from residual waste materials after the recyclable fractions are removed. It currently makes up 50% of the fuel mix in Platin. Calorific value 18MJ/kg.



TYRES

Tyres consist mainly of rubber compounds, textiles and small quantities of wire. Tyres are not currently used at Platin but plans are in place to introduce them. The tyres will be chipped off site before being delivered to Platin. Calorific value 27MJ/kg.



MEAT AND BONEMEAL

Meat & Bonemeal (MBM) is produced by rendering, grinding and sterilising at high temperature and pressure by-products of the meat industry. This fuel is produced off site to a defined chemical and physical standard for the cement industry. Currently MBM is not used at Platin. Calorific value 15MJ/kg.

ALTERNATIVE FUELS AND RAW MATERIALS

Irish Cement intends to apply for planning permission and for a review of the Industrial Emission (IE) licence in Platin to allow for an increase in the quantity and range of alternative fuels (AF) and alternative raw materials (ARM) to be used in both kilns. A range of materials have been selected as suitable for Platin following reference to existing permissions and guidance by the Environmental Authorities in Switzerland and Germany. These materials are already licensed for use by the Environmental Protection Agency (EPA) for cement production in Ireland. The use of these additional materials will advance the fossil fuel replacement programme in Platin. Emissions from industrial facilities, like cement plants are tightly controlled under European Regulations. Experience in Europe, together with our own experience over the past 5 years, demonstrates that the emissions do not increase when we use alternative fuels. All of these materials can be processed safely in Platin because of the high operating temperature which ensures complete consumption. All materials accepted in Platin are subjected to testing to ensure they meet the agreed specifications and comply with strict quality control standards. The range of materials has been grouped into five general categories and includes: fine, coarse and 'free-flowing' solids, pumpable fluids and alternative raw materials. The cement industry has been safely consuming these materials throughout Europe for more than 35 years.

FINE SOLIDS

e.g. chipped timber, shredded plastics, shredded textiles, tyre fluff

COARSE SOLIDS

e.g. shredded wood, dry filter cakes, shredded rubber These fine materials (typically sized 10-50mm) will be delivered to site, ready to use and offloaded from trucks into enclosed storage bays or halls from where they will be pneumatically conveyed to the kiln system. This system will be similar to the existing SRF handling and feeding system.

These materials will be prepared off site to a defined specification before being delivered to site. The materials will typically have a larger particle size (30-120mm) and will be offloaded from trucks into bunkers inside enclosed halls and then transferred using screw-feeders or overhead cranes to the kiln feeding system.

FREE-FLOWING SOLIDS

e.g. sewage sludge pellets, SRF pellets

PUMPABLE FLUIDS

e.g. secondary liquid fuels (SLF), waste oils, paint sludge

ALTERNATIVE RAW MATERIALS

e.g. water treatment filter cake, soils and stones Some fuels will be 'free-flowing' solids or powders that will be offloaded into sealed silos. From here, they will be pneumatically conveyed to the kiln burners in enclosed pipelines.

These fuels will be delivered by tanker and offloaded using pumps into on site storage tanks located in bunded areas. The fuels will be pumped to the kiln burners in enclosed pipelines.

These materials can have a variable consistency, from sludges, filter cakes, powders, dust, etc. They will be stored on site in covered storage areas and conveyed using the existing raw materials handling and dosing systems. The use of these materials will allow Platin to replace some of the virgin raw materials it currently consumes.



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Platin, like all large industrial facilities, operates under an Industrial Emission (IE) licence from the Environmental Protection Agency (EPA) and all emissions are strictly monitored and controlled. The plant also operates to the international environmental management standard ISO 14001. Under the current IE licence, the use of alternative fuels is permitted in Kiln 3. As part of our new plans, an application will be submitted to the EPA for a revision of the existing licence to increase both the range and quantity of permitted alternatives fuels and to allow the introduction of alternative raw materials in both Kiln 2 and Kiln 3.

The IE licence is based on European Environment Regulations which set out minimum temperatures and residence time limits for the use of waste fuels. Both the temperature and residence time in our kiln systems significantly exceed what is required under current Regulations.

When alternative fuels were first introduced to European cement plants, local communities naturally had questions about them, 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 the controls in place. Furthermore, the successful use of alternative fuels over time in Europe has contributed to confidence among the local communities. We now also have positive experience over the past five years in Platin to confirm the safe use of alternative fuels.

Ahead of this proposed increase in alternative fuel use, detailed monitoring and modelling of future emissions and traffic have been completed. This work demonstrates no significant increases in emissions from our operations and no traffic impacts on any local roads around Platin.



HEALTH AND SAFETY

The health and wellbeing of our employees, visitors and neighbours is a primary concern for Irish Cement. All operations in Platin must be carried out in full compliance with Irish Cement safety procedures. For Irish Cement, managing health and safety at our facilities is our primary concern. Safety Managers work closely with and assist managers and supervisors in developing safety management systems, improving safety performance and encouraging a 'Safety Culture' on site. The activities of our Safety Committee, which has members from across the workforce, helps to ensure employee engagement in eliminating day to day risks and identifying 'better ways of working'. Safety Statements provide the necessary detail for safe operations and work practices on site. Through the use of risk assessments, safety inductions and regular safety training, Irish Cement is dedicated to the ongoing safety of our employees, contractors,

visitors and neighbours. Measurement and reporting against targets ensures that safety remains a top priority for workers and management alike.

Irish Cement's parent company, CRH, also sets the highest priority on Health and Safety and ensures that safety management is a daily priority for managers in every CRH location. CRH health and safety management systems are well established and are regularly reviewed, taking into account international best practice. Knowledge-sharing around the CRH Group also plays an important part in maintaining focus on safe working practices and elimination of risks.



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KEY BENEFITS OF CO-PROCESSING ALTERNATIVE FUELS



ADVANTAGES OF CEMENT KILNS

- High temperatures and long residence times ensure complete combustion
- 2 Extremely efficient at capturing energy from alternative fuels
- **3** Produce no residual wastes

If you have any questions or would like to discuss any of the information contained within, please contact us. Irish Cement Limited, Platin, Drogheda, Co. Louth T 041 987 6000 W www.irishcement.ie E info@irishcement.ie

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