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British Lime Association

Sustainable Development Report 2013

bla british lime association

Mineral Products Association

FOREWORD

This is our fourth sustainable development report as the British Lime Association and we are extremely proud of the progress we have made so far. As an industry, we have invested heavily in making UK lime production both efficient and sustainable, whilst weathering the storm of the economic recession. At present, UK lime sales are relatively stable at just over 1.7 million tonnes, which gives a consistent picture of the varied markets that use lime.

The coming years will be a fragile stage in the industry's recovery and the sector is in need of support from the UK to ensure our home grown, historic sector recovers and flourishes after such difficult times. For lime, kick-starting UK construction and manufacturing and achieving sustained growth is essential.

The UK lime industry has also made great progress in health and safety in recent years. Producers collaborate and share knowledge of common incidents and best practice throughout the industry, working to achieve a target of zero incidents. Although there is still work to do, the industry is fully committed to this goal.

Lime producers have also made some significant and beneficial changes to the lime manufacturing process. From introducing systems that use waste heat to power the plant to constructing anaerobic digesters on site, lime producers are finding new, innovative ways to reduce their environmental impacts.

As an industry, we will continue to work together to further reduce our environmental impacts, operate sustainably and ensure all of our employees are safe, year on year.

John Carlill
Steetley Dolomite Ltd

Cedric de Vicq
Lhoist UK

Viv Russell
Lafarge Tarmac

Richard Stansfield
Singleton Birch Ltd

Robert Brown
Specialty Minerals

Alastair Dunn
TATA Steel

Richard Pike
British Sugar plc

Chris Queen
TATA Steel

HOW WE MAKE LIME

There are two types of lime made in the UK; high calcium lime and dolomite. High calcium lime is produced from burning limestone or chalk, which is calcium carbonate ($CaCO_3$), at temperatures of up to 1400ºC in either a vertical kiln or horizontal rotary kiln.

Dolomite is produced from burning dolomitic limestone, which consists of $CaCO_3$ and Mg CO_3, at temperatures of around 2000ºC in a horizontal rotary kiln.

The key performance indicators related to the production process have been separated into the two types of lime in this report, due to the substantial differences between the two methods of manufacture.

KEY ACHIEVEMENTS RELATIVE TO 2011 BASE YEAR	
79%	Reduction in SO_2 emissions from high calcium lime production
44%	Reduction in waste disposed to landfill
30%	Reduction in Lost Time Injuries (LTIs)
30%	Reduction in dust emissions from dolomite production
15%	Increase in use of waste derived alternative fuels in dolomite production - over 50% of fuel used in 2013
5%	Reduction in water usage in lime production
5%	Reduction in CO_2 emissions from dolomite production

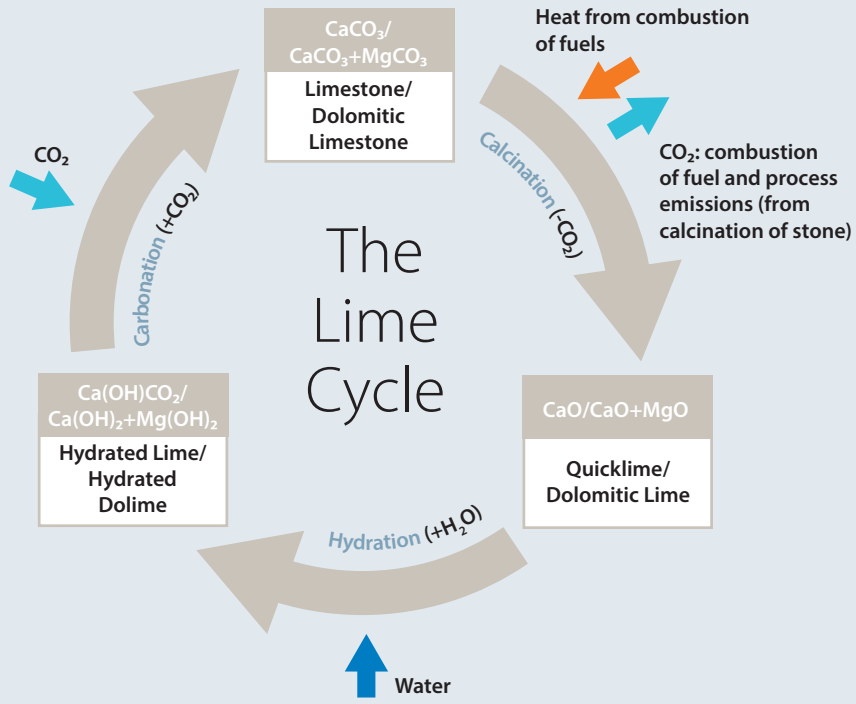
CO_2 EMISSIONS

The Lime Cycle

When limestone, chalk ($CaCO_3$) or dolomitic limestone ($CaCO_3$, $MgCO_3$) rock is heated to high temperatures inside a kiln a chemical reaction is triggered, which releases carbon dioxide (CO_2) from the rock. The released carbon dioxide is called 'Process CO_2' and makes up around 75% of the CO_2 generated from high calcium lime production and 53% from dolomite production.

Process CO_2 is produced by the chemical reaction in the manufacturing process and is therefore irreducible.

Over its lifetime, lime reabsorbs CO_2 from the air around it. This natural process is known as carbonation and closes the link in the lime cycle.



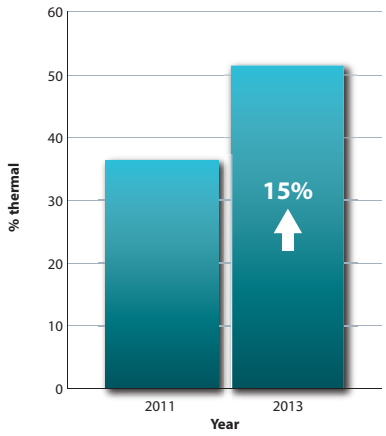
CO_2 Mitigation & Energy Efficiency Measures

All BLA members participate in UK and European carbon and energy efficiency schemes as well as holding environmental management certification. They have invested heavily in energy efficiency measures and process optimisation. In the last year alone, lime producers have spent over £6 million on improvements to their manufacturing process for environmental gain.

Where possible, alternative fuels are used to replace fossil fuels. In 2013, the dolomite industry substituted 51% of total fuel used for production with alternative fuels derived from waste products. This is the highest level of fossil fuel replacement seen in the UK lime industry so far, and reflects the commitment by the industry to reduce their reliance on fossil fuel sources as much as is technically possible.

One major restriction the lime industry experiences with fossil fuel replacement is the high quality specification required for products which are used for pharmaceuticals and drinking water purification. This means that high calcium lime producers are technically constrained to using only the cleanest, highest quality fuels. Producers will continue to research and develop possibilities for fuel replacement in the future, which do not compromise the quality of their end products.

Waste derived fuel use as a percentage of total fuel-dolomite manufacture only (% thermal)



High calcium lime

Total CO_2 emissions have increased by 4% between 2011 and 2013. Whilst combustion emissions remained fairly stable, process emissions have increased slightly due to natural variations in the carbon content of the stone.

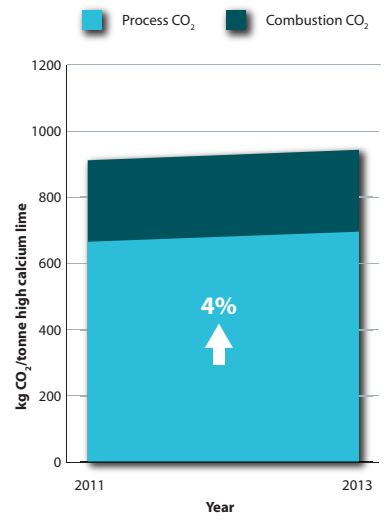
Case Study: Anaerobic Digestion

Singleton Birch has recently commissioned a 1.5MW anaerobic digestion (AD) facility at its Melton Ross Lime works. This facility will generate 12,000MWh/year of electricity, which will be consumed at the existing lime works, and equates to 40% of the site power consumption. The facility was officially opened by Lord Haskins, Chairman of the Humber LEP.

Singleton Birch embarked on the project as part of their sustainability strategy to control energy costs, reduce carbon footprint and reduce reliance on grid electricity.

The facility has been project managed in-house by the Singleton Birch project team and constructed to the company's usual exacting standards. The key contractors were selected following a process of competitive tender and due diligence.

Emissions of CO_2 per tonne of standard purity high calcium lime



CO_2 EMISSIONS

Dolomite

CO_2 emissions have decreased by 5% in total. This is very encouraging and is a direct result of positive changes to the dolomite manufacturing process. Further improvements are expected next year, as a result of major investments at dolomite production plants.

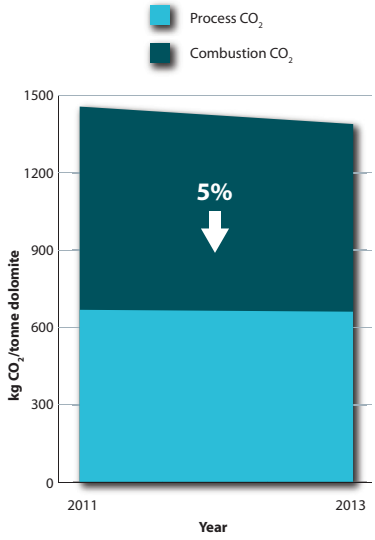
Case Study: Waste to Heat Electricity Generation

At the end of 2013, Steetley Dolomite completed a £1.3 million project, which allowed for the excess heat in the flue gasses to be reclaimed and used to generate electricity for the plant to use. This reduces the demand by the plant on the current electricity supply grid and maximises the use of the energy required for the calcination process.

The waste heat to power plant system takes the waste heat from the gasses passing through the electrostatic precipitator and uses it to vaporise a refrigerant, which then drives a rotary generator. The electricity produced is fed back in to the system supplying the plant. The system has the ability to generate 3000MWh annually and reduce the CO_2 output by 1600tpa.

The 4 units produce 30-40% of the power required to operate the Thrislington plant, a similar system is being considered for one kiln at the Whitwell plant.

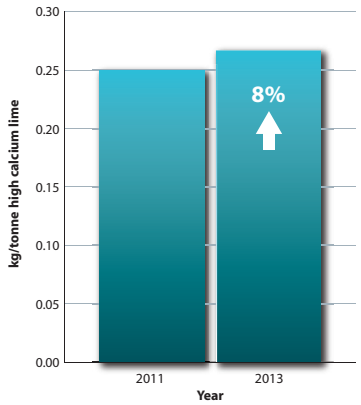
Emissions of CO_2 per tonne of dolomite



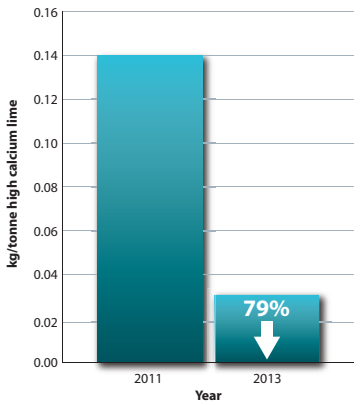
EMISSIONS TO AIR (EXCLUDING CO_2)

High calcium lime

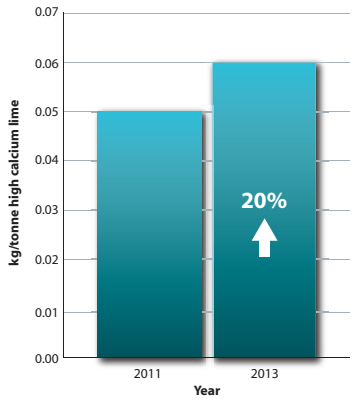
NO_x emissions to air per tonne high calcium lime manufactured



SO_2 emissions to air per tonne high calcium lime manufactured



Point Source Dust emissions to air per tonne high calcium lime manufactured



Oxides of Nitrogen (NO_x) Emissions

NO_x emissions have increased by 8% between 2011 and 2013. The cause of this rise began in 2012, where significant variations in market demand for different types of lime product meant there was a different mix of kiln types operating compared with 2011. Crucially, all site emissions remained below the permitted limits for lime plants, as regulated by the Environment Agency. A significant improvement is anticipated in 2014.

Sulphur Dioxide (SO_2) Emissions

Encouragingly, SO_2 emissions generated from high calcium lime manufacture have decreased by 79% since 2011. This is as a result of the sector actively managing their emissions and making changes to their manufacturing processes to achieve noteworthy reductions.

Point Source Dust Emissions

Dust emissions from high calcium lime production have increased by 20% since 2011. Despite this disappointing increase, emissions are still in compliance with the regulated limits for lime sites. Actions taken in 2014 will result in significant improvements in dust emissions.

Case Study: Focus on Dust Emissions

Lafarge Tarmac have strongly focussed on minimising dust emissions from their plant, which includes dust from the production process and fugitive site emissions.

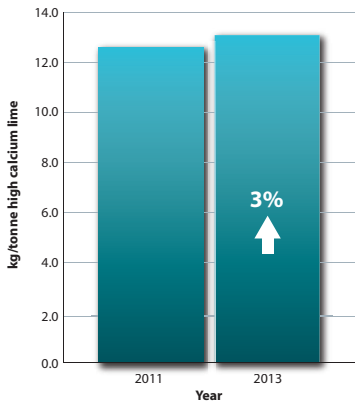
Firstly, there was a focus on housekeeping and redesign of equipment associated with spillage or dust, to improve the safety of the working conditions. The site also improved their loading systems, to reduce fugitive dust when lime is transferred into vehicles for delivery. This involved making the discharge chute moveable and installing cameras for drivers so they no longer have to leave their cab when loading lime. These changes have significantly reduced dust levels and have minimised any potential exposure to drivers.

Lafarge Tarmac also re-engineered their hydrator dust abatement technology. A pilot project was implemented and this resulted in a substantial reduction of 80% in particulate emissions on 1 unit. The changes will now be rolled out to all of the remaining plant.

EMISSIONS TO AIR (EXCLUDING CO_2)

Dolomite

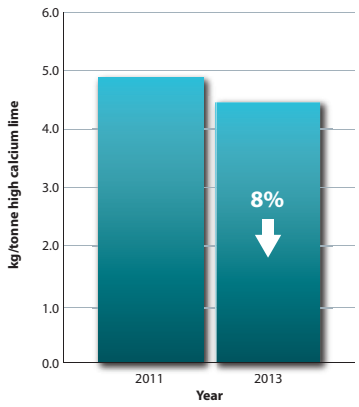
NO_x emissions to air per tonne dolomite manufactured



Oxides of Nitrogen (NO_x) Emissions

NO_x emissions have increased by 3% between 2011 and 2013. This is related to the increased production of sintered dolomite products, which require a double pass through the kiln and higher temperatures to achieve a product that is extremely dense. This is a key characteristic that is required for refractory materials, of which there is growing international demand for at present.

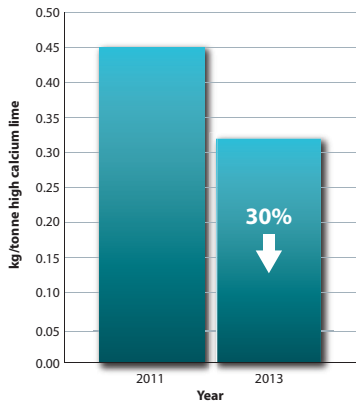
SO_2 emissions to air per tonne dolomite manufactured



Sulphur Dioxide (SO_2) Emissions

SO_2 emissions from dolomite production have decreased by 8% since 2011. This is due to a combination of further investment in production equipment and the fuel mix that is used to feed the production process.

Point Source Dust emissions to air per tonne dolomite manufactured



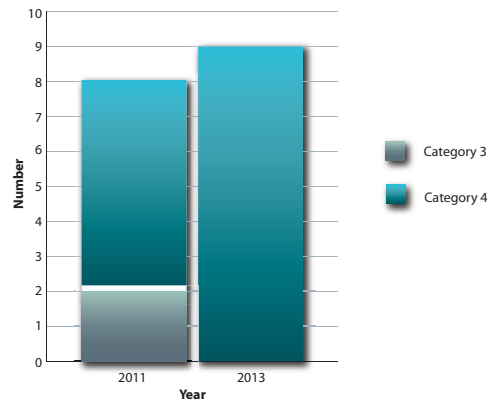
Point Source Dust Emissions

Dust emissions from dolomite production have decreased by 30% since 2011. Further improvements to raw material screening techniques and electrostatic precipitators during 2013 have caused this reduction.

ENVIRONMENTAL IMPROVEMENTS

Environmental Management

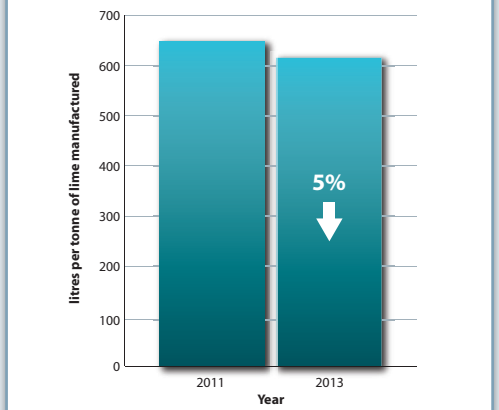
Number of Category 3 and 4 Environmental Incidents



In 2013 there were no enforcement notices, formal cautions or prosecutions. The number of environmental incidents has increased slightly since 2011, however in 2013 all the incidents were Category 4 incidents, which are "a non-compliance which has no potential to have an environmental impact"[2], as defined by the Environment Agency.

Water resource efficiency

Total water use (potable and abstracted)



The lime sector is very aware of the current and potential pressures on water resources in the UK and has taken action to reduce its usage. Between 2011 and 2013, total water consumption reduced by 5%. This has been achieved by continuous efforts to minimise usage for activities such as wheel washing and dust suppression.

[2] please see notes on page 7

ENVIRONMENTAL IMPROVEMENTS

Waste minimisation

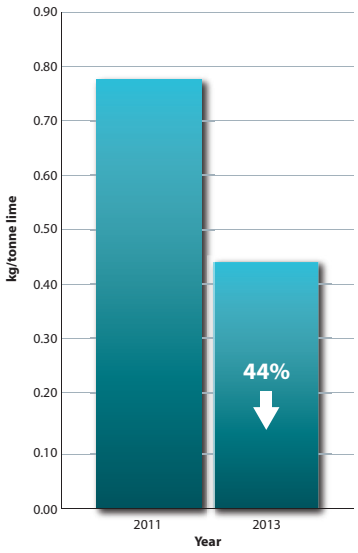
Minimising waste and reducing waste sent to landfill is a high priority for the lime sector. Producers strive to use landfill as the last resort for waste disposal, and this is illustrated in the 44% reduction they achieved between 2011 and 2013.

Case Study: Increasing Resource Efficiency

Lhoist UK operate two kilns which are able to heat limestone in the size range of 30mm – 120mm to produce lime. Historically, the stone that is suitable for the kiln process made up around 57% of extracted limestone, with the rest being used for aggregates.

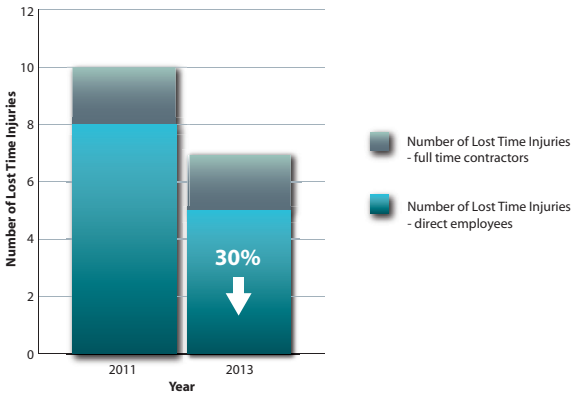
Recent modifications to the wash plant and stone handling plant screening decks has increased the percentage of extracted limestone that is suitable for the kiln to 59%. This improvement has led to a 2.5% reduction in limestone that is required to be extracted, on an annual basis. This has also led to a reduction in drilling and blasting, loading and hauling of raw material and energy consumption.

Total waste disposed to landfill per tonne lime manufactured (kg/tonne lime)

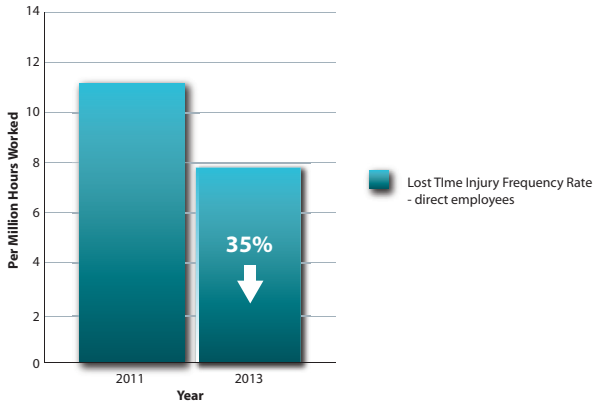


Health and Safety

Total Number of Lost TIme Injuries



Lost Time Injury Frequency Rate



Statistics

The health and safety of employees and contractors is the top priority for the UK lime industry and all companies have a target of zero incidents.

The UK lime industry has reduced the number of Lost Time Injuries for direct employees and contractors by 30% between 2011 and 2013 (data collected from BLA Members only). Furthermore, there has been a 35% reduction in the Lost Time Injury Frequency Rate (direct employees, BLA Members only).

Communication and Sharing

All companies are represented on the lime health and safety working group, where members meet throughout the year to share experiences, best practice and details of any incidents or near hits that have occurred.

Workshops

Lime producers run annual workshops on key industry topics highlighted in the objectives for the year. The industry recently facilitated a valuable workshop on plant maintenance and cleaning practices, which managers, engineers and supervisors from each company attended.

Wider Health and Safety Strategies

The lime sector is also part of the Mineral Products Association (MPA), which was the first trade association to sign up to the Health and Safety Commission's Hard Target. The MPA has created a whole family of 'Safer by' initiatives, which focus on a range of key issues, including machinery and plant design, staff competence and sharing knowledge industry-wide.

make the link
to mineral products

COMMUNITY ENGAGEMENT

Lime production facilities are located in rural areas of the UK and provide jobs for the local population, both directly and indirectly, through local supply chains.

As well as helping to support the local economy, regular engagement with the local community through liaison meetings is important to maintain positive community relationships. The 15 meetings held in 2013, also attended by the Environment Agency, provided an important forum to discuss local topics of interest. The industry also welcomed 455 visitors to their plants during 2013.

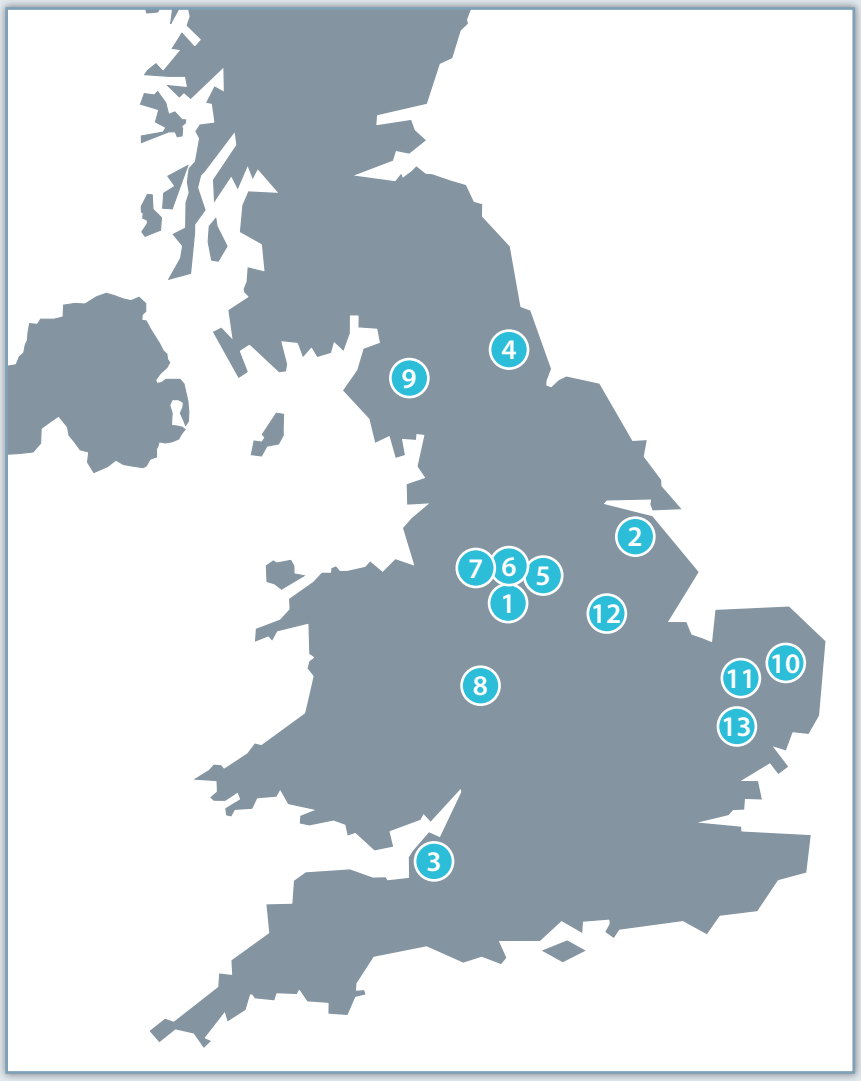
LIME PLANTS

BLA members

Factory/Site Owner	Location	
Lhoist UK	Buxton	1
Singleton Birch	Melton Ross	2
	Batts Combe	3
Steetley Dolomite Limited	Thrislington	4
	Whitwell	5
LAFARGE TARMAC	Tunstead	6
	Hindlow	7

BLA associate members

Factory/Site Owner	Location	
Specialty Minerals	Birmingham	8
TATA STEEL	Shapfell	9
BRITISH SUGAR	Norwich	10
	Norfolk	11
	Notts	12
	Suffolk	13



NOTES

1 Standard purity stated for lime (94.5%) is sourced from the EU Commission Decision of 27 April 2011 "determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council", Page 37 Available: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:130:0001:0045:EN:PDF

2 Environment Agency's Compliance Classification Scheme (CCS):

Category 1 incident defined as "a non-compliance which would have the potential to have a major environmental impact".

Category 2 incident defined as "a non-compliance which would have the potential to have a significant environmental impact".

Category 3 incident defined as "a non-compliance which would have the potential to have a minor environmental impact".

Category 4 incident defined as "a non-compliance which has no potential to have an environmental impact".

BLA is part of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and silica sand industries.

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