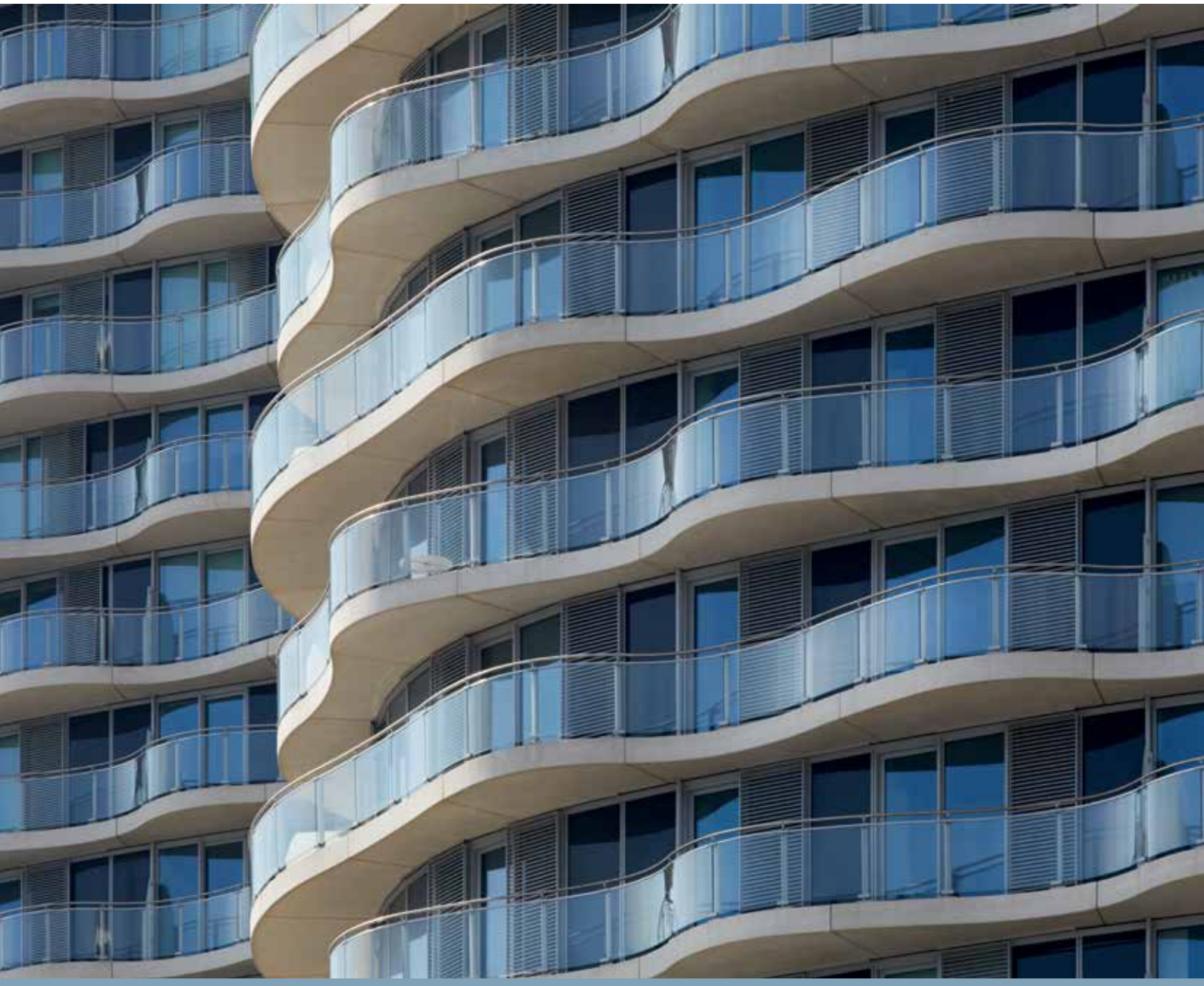
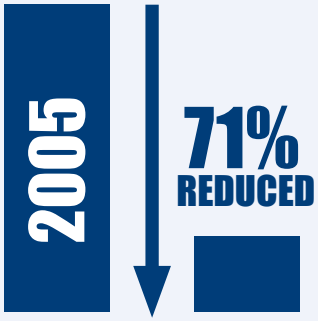
mpa
essential materials
sustainable solutions



MPA Cement

Sustainable Development Report 2019

SUMMARY OF PERFORMANCE



Health and safety
LTIs 71% lower since 2005

Decarbonisation
CO_2 emissions reduced 25% from 1998

Waste diverted
0 process waste to landfill

Waste and by-products recycled from other sectors = 1.4Mt

43%

Fossil fuel replaced
43% waste derived fuels

£152bn

Cement was a key contributor to the £152 billion construction industry

Domestic cement sales increased 29% on 2012 (but 1% lower than 2017)

INTRODUCTION

Following the launch of the MPA Charter in 2017, MPA Cement's Sustainable Development Report is aligned with the seven MPA strategic priorities. In particular, this report highlights the positive contribution the cement industry made in 2018 on Communicating Industry Value, Health and Safety, People, Resource Use, Climate Change and Energy, the Natural Environment and the Built Environment.

MPA Vision *'to be valued as an essential and economically, socially and environmentally sustainable industry of significance to the economy and our way of life'.*

MPA's 7 Strategic Priorities

Communicating Industry Value

Cement is a great British invention and an essential material for a modern society.

In 1824, British inventor Joseph Aspdin patented the production of 'Portland Cement' as a building material which resembled 'Portland stone'. Modern cement is a great invention that has been critical to our ability to provide water supply and sewerage systems, transport systems, energy supply, housing and other buildings and infrastructure for the 20th and 21st centuries.

Today, the cement industry is a vital component of the concrete supply chain. The five companies manufacturing cement in the UK, Aggregate Industries (operating as Lafarge Cement), Breedon Cement, CEMEX, Hanson, and Tarmac, together supplied 78% of the cement consumed in the UK in 2018.

Health and Safety

The industry is committed to the highest standards of health and safety for employees, contractors, neighbours and customers.

The annual Kiln Shutdown Maintenance guide underwent a major review following industry consultation and a re-examination of historical incidents/near misses. Hazards were defined along with control measures and examples of good practice within the industry. Confined Spaces, Isolation Procedures, Lifts & Lifting, Falls from Height, Falling Materials and Wrong Person/Wrong Place were a particular focus. The remote wrecking robot used by CEMEX was widely promoted across the industry as a solution that removed people from risk.

A Customer Site Safety Working Group was formed in response to a number of silo over-pressurisation incidents that occurred at customer sites. Customer Site Assessments have been updated and Driver's Safety Cards have been produced.

People

Domestic cement production provides skilled jobs and training opportunities across the UK.

2,250 direct employees

12,601 employee training hours

£222k charitable donations made

4,212 voluntary hours worked by staff during normal working hours

25 local liaison meetings

7,831 visitors to cement plants

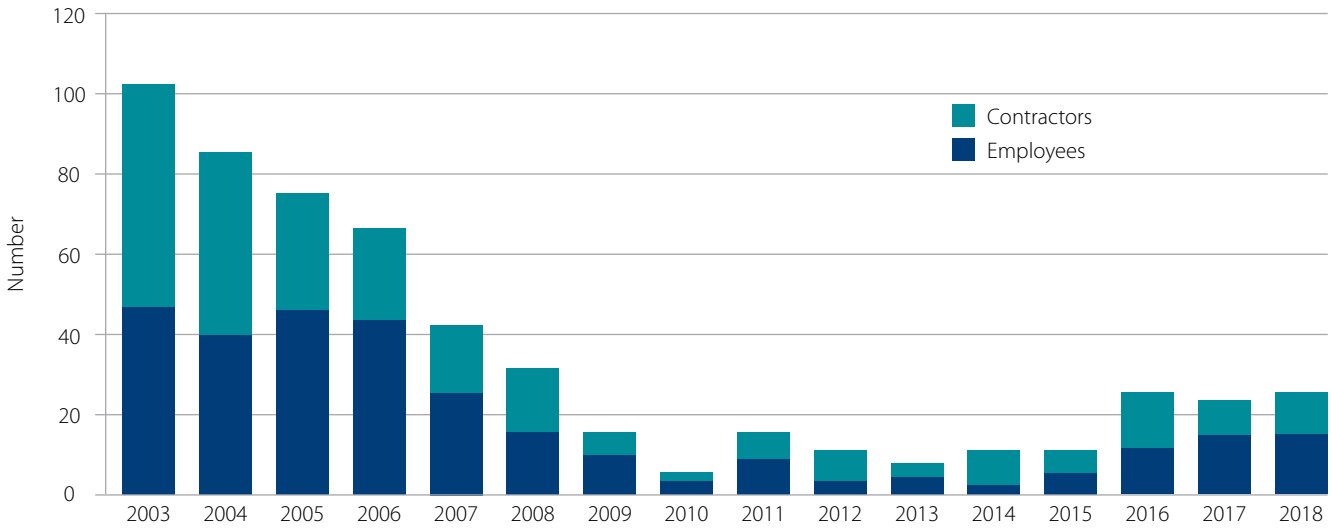


Figure 1: Lost Time Injuries 2003-2018

Resource Use

The UK Cement industry's use of alternative waste derived fuels and raw materials is a great example of the circular economy.

The cement production process has a unique capability to recycle minerals and recover heat simultaneously (known as co-processing). Cement producers take low/zero value waste material from other sectors of the economy and turn it into an essential and strategic material, cement. In 2018, 1.4 million tonnes of waste and by-products from other industries were co-processed in cement production. This resulted in a recycled content of cement of almost 10%.

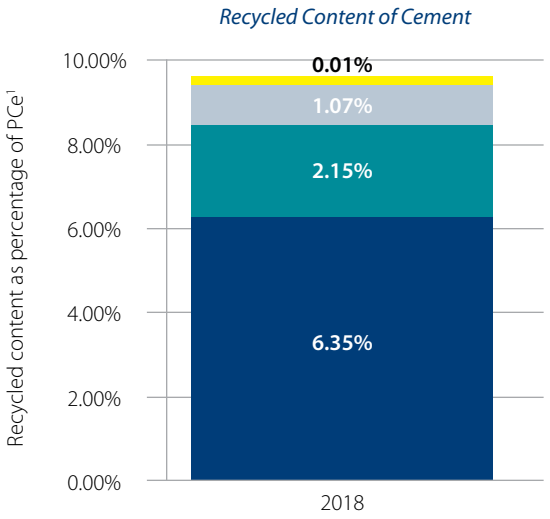


Figure 2: The proportion of recycled content in UK produced cement from kiln dust (KD) recovered on site, fuel ash recycled as mineral content, alternative raw materials (ARM) that are ground with clinker to produce cement and ARM fed to the kiln (kiln feed).

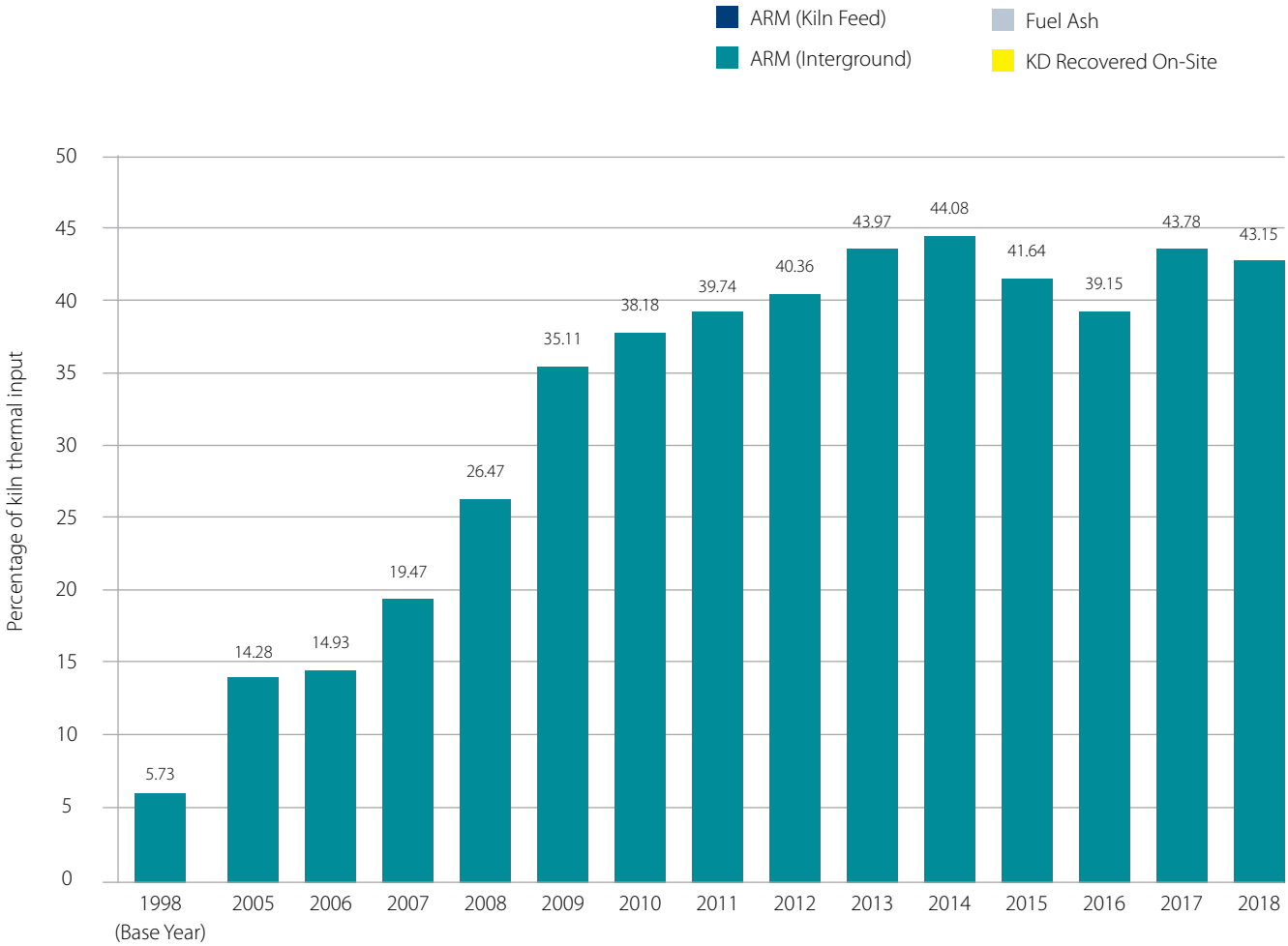


Figure 3: Waste derived fuel use in 1998 (base year) and from 2005-2018

[1] *Portland cement equivalent (PCe) is a normalising factor related to cement output, which enables a comparison of impacts, such as environmental impacts, between sites whilst taking into consideration differing production methods, cement product types and movement of intermediate products.*

Climate Change and Energy

The UK cement industry is committed to innovative sustainable and efficient production.

The UK cement industry has been successful in improving its carbon footprint by increasing energy efficiency, using alternative fuels instead of traditional fossil fuels, and utilising renewable energy sources. Further decarbonisation will be challenging and will require innovations such as Carbon Capture and Utilisation/Storage.

In 2018, direct emissions of CO_2 per tonne PCe from the UK cement industry were 25% lower than in 1998. Waste derived fuels made up 43% of the thermal input with waste biomass fuels composing 17% of the thermal input to the cement manufacturing process.

Looking ahead, from 2019 MPA is leading a project looking at innovative ways to fuel switch to a near net zero fossil fuel CO_2 cement manufacturing process.

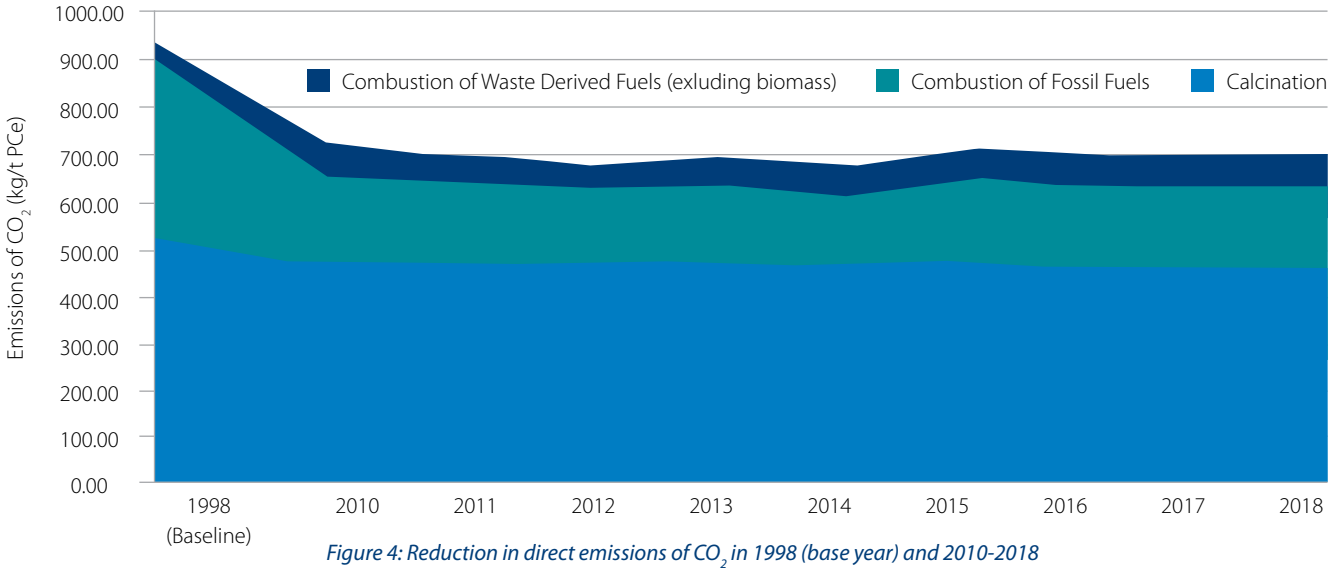


Figure 4: Reduction in direct emissions of CO_2 in 1998 (base year) and 2010-2018

Natural Environment

Through continuous investment, rationalisation and innovation, the UK cement industry has negligible impact on air quality.

In 2018, MPA actively engaged with Defra on development of its Clean Air Strategy for England and the UK-wide National Air Pollution Control Programme. The cement industry has already invested heavily in cleaner processes and made considerable progress in reducing its impact on the natural environment. Emissions of Oxides of Nitrogen (NOx), Particulate Matter (PM) and Sulphur Dioxide (SO_2) per tonne PCe were 68%, 87% and 84% lower than in 1998 respectively.

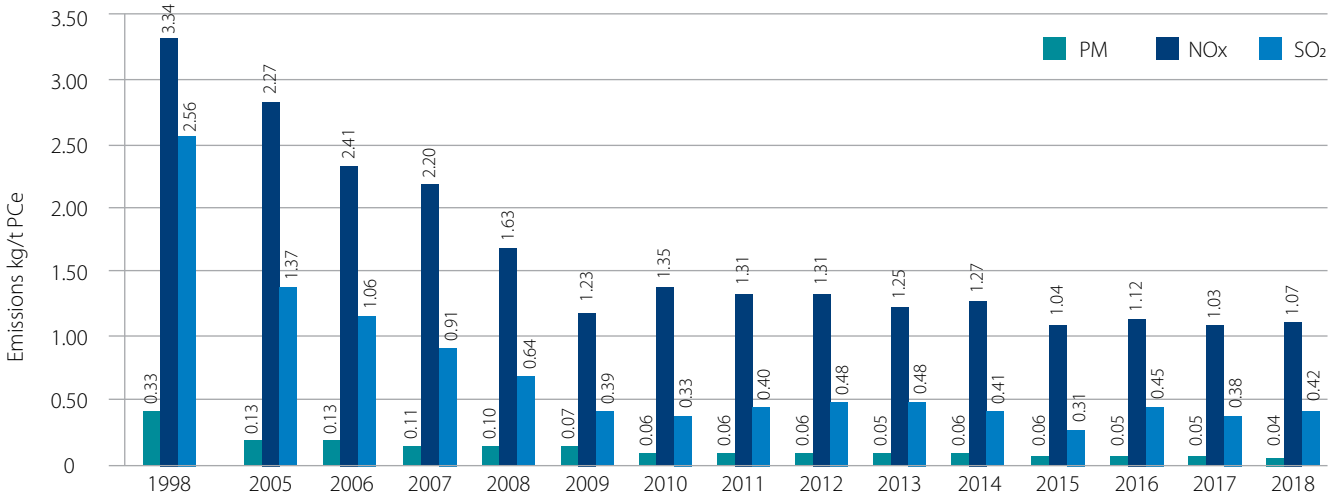


Figure 5: Emissions of NOx, PM and SO_2 in 1998 (base year) and from 2005 to 2018 - since 2008, emissions have been at a steady low rate with only very minor fluctuations since 2009

Built Environment

Cement is a sustainable material that has unique properties throughout its life cycle.

The main use of cement is in concrete. Concrete is…

- An essential material for our homes, buildings and infrastructure
- Sustainable, local and responsibly sourced
- Safe and protects people and properties against fire and other threats
- Tackling climate change and key to a net zero carbon economy
- Innovating to meet the future needs of society
- Enabling great design that enhances our quality of life

The unique properties of cement and concrete make it a sustainable construction material which also keeps us safe and comfortable in our homes.

WHAT MAKES CONCRETE THE IDEAL BUILDING MATERIAL?

Responsibly sourced: locally available, abundant

Affordable: low cost and easy to use

Resilient: resists flood, fire, rot and pests

Long lasting: durable, low maintenance

Versatile: can be poured, placed or stacked onsite or offsite for use in buildings and infrastructure

Energy efficient: resists steep fluctuations in heat/cool cycle

Safe: high strength, healthy buildings, comfortable, acoustic isolation, fire safe

Environmental: 100% recyclable, high recycle rate, low carbon, absorbs CO_2

DATA TABLES

RESOURCE USE											
	Units	**1998**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Total waste and by-products used as fuel and raw materials	tonnes	446,511	1,528,315	2,481,106	1,811,200	1,452,553	1,612,584	1,619,766	1,454,354	1,549,393	1,414,195
Proportion of raw material comprising waste	%	4.0	7.2	7.6	7.6	7.0	7.7	7.4	5.9	6.9	5.8
Proportion of fuel comprising waste material	%	5.7	38.2	39.7	40.4	44.0	43.0	41.6	39.2	43.8	43.2
Biomass fraction of fuel input (100% and part biomass fuels)	%	Not available	16.7	16.8	17.2	18.9	19.9	18.5	16.7	18.3	17.2
Process waste recovered on-site	tonnes	Not available	11,379	9,195	2,819	10,390	1,513	11,009	4,086	2,270	1,401
Process waste recovered off site	tonnes	0	36,945	47,796	57,471	47,238	33,988	35,103	49,238	43,273	41,186
Process waste sent to landfill	tonnes	289,207	14,021	4,631	0	0	0	0	0	0	0

CLIMATE CHANGE AND ENERGY											
	Units	**1998**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
CO_2 emissions from calcination (process emissions)	$kgCO_2$/ tPCe	520	471	468	459	468	462	476	464	465	467
CO_2 emissions from combustion of fossil fuels	$kgCO_2$/ tPCe	387	187	177	169	164	158	172	172	164	166
Indirect CO_2 emissions from electricity use	$kgCO_2$/ tPCe	Not available	55	61	56	44	58	57	48	36	30

NATURAL ENVIRONMENT											
	Units	**1998**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Emissions of NOx	kg NOx/ tPCe	3.34	1.35	1.31	1.31	1.25	1.27	1.04	1.12	1.03	1.07
Emissions of PM	kg PM/ tPCe	0	0.06	0.06	0.06	0.05	0.06	0.06	0.05	0.05	0.04
Emissions of SO_2	kg SO_2/ tPCe	2.56	0.33	0.40	0.48	0.48	0.41	0.31	0.45	0.38	0.42
Mains water use	m^3/tPCe	Not available	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.07	0.04
Licensed abstraction	m^3/tPCe	Not available	Not available	Not available	0.04	0.04	0.05	0.07	0.10	0.05	0.05

make the link
to mineral products

MPA Cement site locations

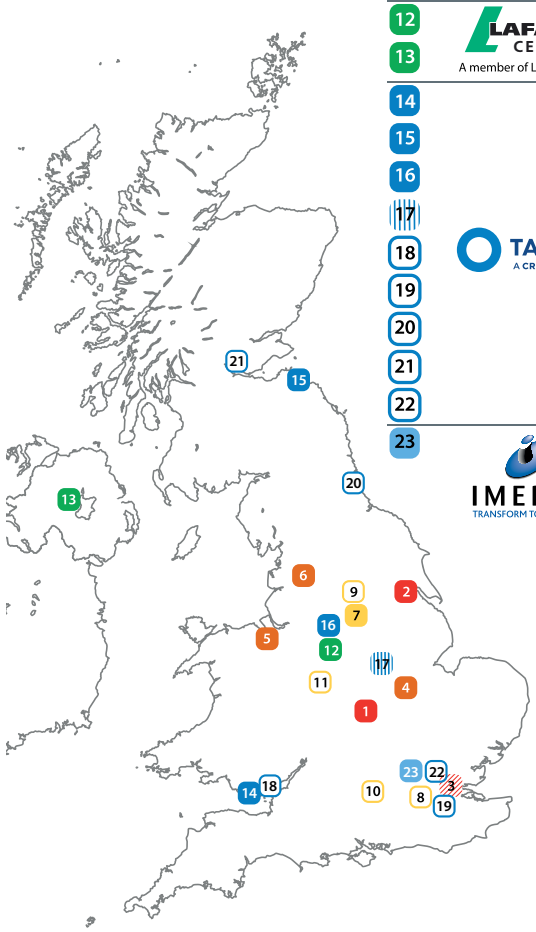
Key

Kiln sites

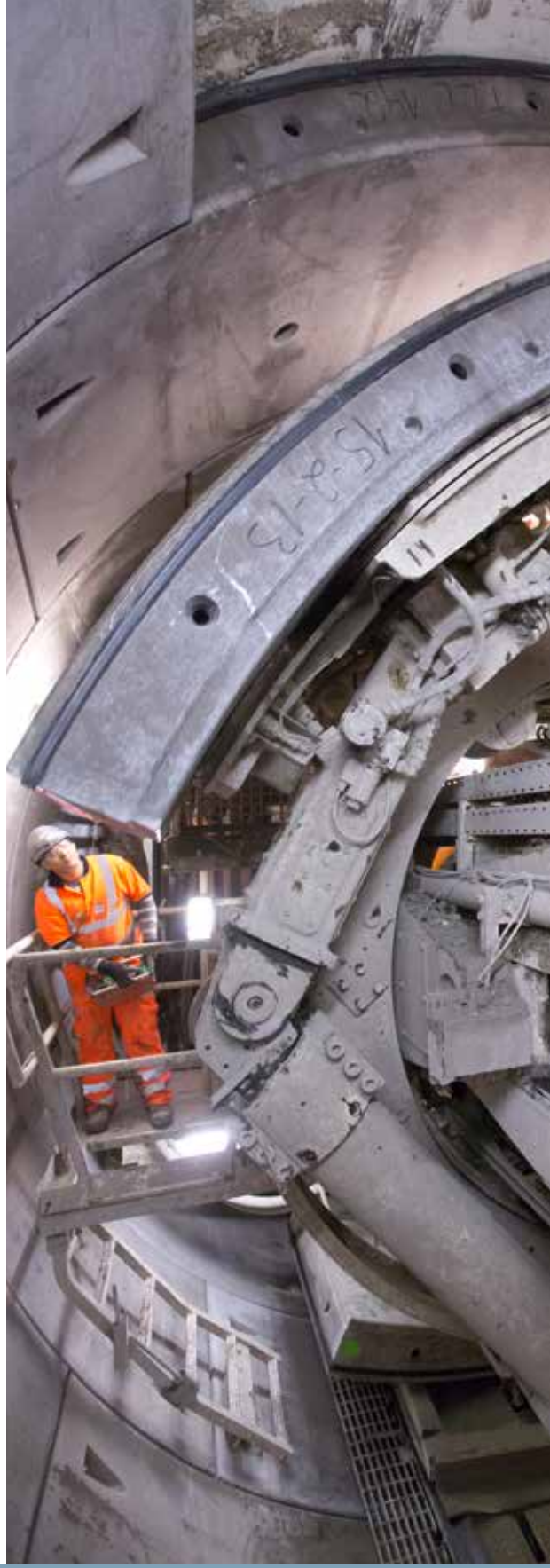
Grinding and blending sites

Grinding only sites

Blending only sites



1	CEMEX	Rugby
2		South Ferriby
3		Tilbury
4	Hanson HEIDELBERGCEMENTGroup	Ketton
5		Padeswood
6		Ribblesdale
7	BREEDON	Hope
8		Dagenham
9		Dewsbury
10		Theale
11		Walsall
12	LAFARGE CEMENT A member of LafargeHolcim	Cauldon
13		Cookstown
14	TARMAC A CRH COMPANY	Aberthaw
15		Dunbar
16		Tunstead
17		Barnstone
18		Celtic Ash
19		Northfleet
20		Seaham
21		Scotash
22		West Thurrock
23	IMERYS TRANSFORM TO PERFORM	Purfleet



This report has been titled as 2019 to follow the general MPA nomenclature to use the year of data collection rather than the year of performance.

*Imerys are members of MPA but data from their operations has not been included in this report because they produce calcium aluminate cements rather than Portland cement.

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MPA Cement 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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