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# CEMENT/EXPOSED

WHAT NOW FOR THE ETS FATCAT?

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sandbag

# Cement Exposed

New data from EU cement sector shows no fall in CO<sub>2</sub> emissions

October 2016

- **Increasing CO<sub>2</sub> intensity:** Data from the Cement Sustainability Initiative shows that specific emissions from the EU cement sector increased in 2014.
- **No carbon leakage:** Since 2011, the EU cement sector has vastly increased its exports of cement clinker to non-EU destinations, demonstrating that the EU Emissions Trading System (EU ETS) has not made the sector globally uncompetitive.
- **Innovation:** New low-carbon cement-making techniques are scalable, already commercial and yield high quality products which dramatically reduce emissions. However, innovation in this area has occurred largely among new entrants and is therefore having a limited impact on the sector's greenhouse gas (GHG) emissions.

## About Sandbag

Sandbag is a Brussels and London-based not-for-profit think tank conducting research and campaigning for effective climate policies.

Our research focus includes reforming the EU Emissions Trading System and the Effort Sharing Regulation; accelerating the phase-out of old coal in Europe; and deep decarbonisation of industry through technologies including Carbon Capture & Storage.

For more information, visit [sandbag.org.uk](http://sandbag.org.uk) or email us at [info@sandbag.org.uk](mailto:info@sandbag.org.uk)

Earlier this year, research by Sandbag<sup>1</sup> revealed that perverse incentives in the design of the EU ETS have resulted in over-allocation of allowances (EUAs) to the cement sector and have even allowed the emissions intensity of the cement sector to increase. Recently published figures from the Cement Sustainability Initiative<sup>2</sup> also show that European Portland cement producers **have not reduced the emissions intensity of cement between when the EU ETS began in 2005 and the end of 2014**. In fact, the sector made greater strides in reducing emissions in the years prior to the ETS. This highlights the inability of the EU's flagship climate policy, as currently designed, to address European cement sector emissions.

*The cement sector's treatment within the EU ETS demonstrates that EU policymakers' overprotection of many industries is halting investment in low carbon technologies.*

We now strongly urge policymakers working on the current EU ETS reform to vote for measures that will stimulate real emission reductions in the cement sector. These include:

1. **A targeted approach to carbon leakage protection** with reformed criteria so that installations only receive a free allocation of allowances appropriate to the extent of their carbon leakage exposure risk;
2. **A more dynamic system of allowance allocation** that is responsive to changes in activity levels. This would reduce incentives for *gaming* of partial cessation and closure rules<sup>1</sup>;
3. **Updating product benchmarks** to reflect the current state of technological progress; and
4. **Introducing policies to support public procurement of low-carbon cement products**

**Without policy reforms the cement sector cannot achieve its share of emission reductions in 2020 and beyond<sup>3</sup>, nor will it be able to fulfil its own targets.**

<sup>1</sup> The Final Carbon Fatcat (Sandbag, March 2016) <https://sandbag.org.uk/blog/2016/mar/16/final-carbon-fatcat/>

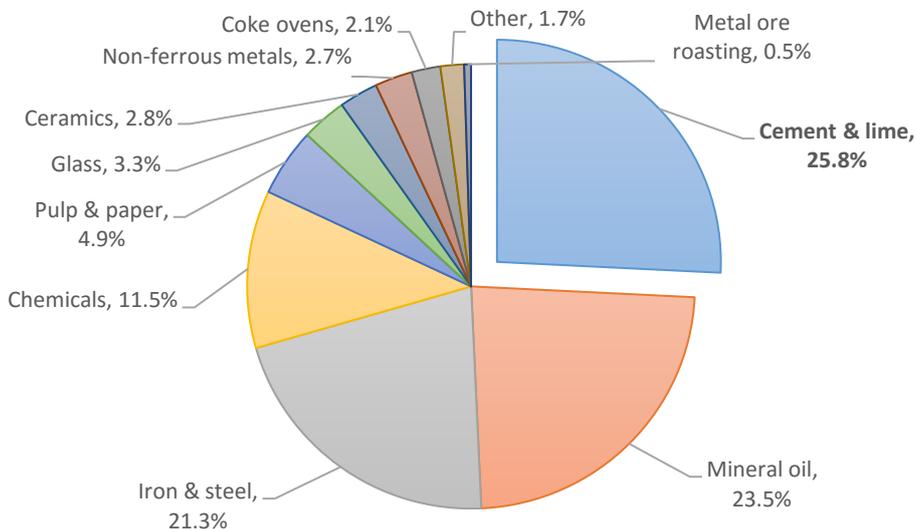
<sup>2</sup> WBCSD Cement Sustainability Initiative. 2016. Getting the Numbers Right Project: Emissions Report 2014 ([link](#))

<sup>3</sup> IEA. (2009). Cement Technology Roadmap 2009: Carbon emissions reductions up to 2050 ([link](#))

This briefing outlines three aspects of the cement industry that should be addressed through EU policy reform: emissions, competitiveness and innovation.

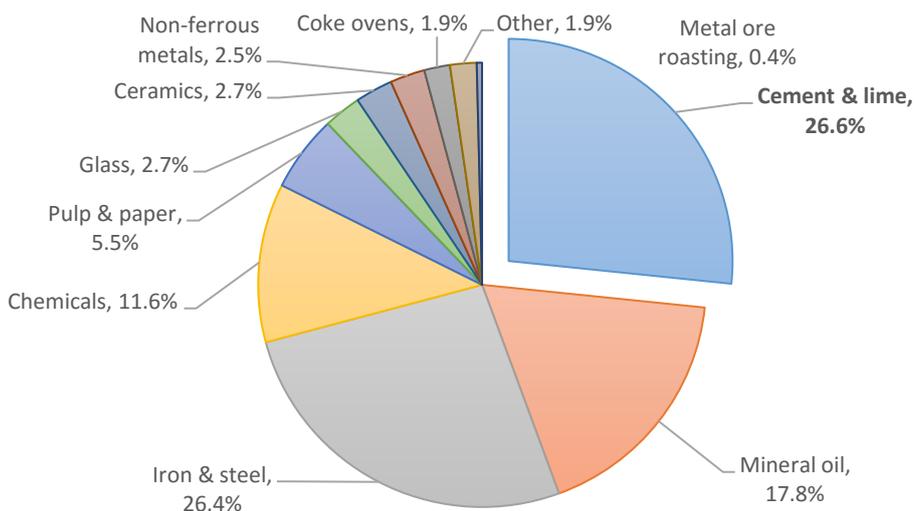
## The EU ETS cement sector

The manufacture of Portland cement and lime emits more GHG emissions than any other industrial sector in the EU ETS: The sectors emitted 144MtCO<sub>2</sub>e in 2015<sup>4</sup>, comprising more than a quarter of all greenhouse gas emissions from EU ETS industrial sectors. The majority of emissions from the cement & lime sectors originate from the production of lime (process emissions) and thermal energy required to produce clinker (fossil fuel combustion emissions).



Breakdown of EU ETS emissions from industrial sectors in 2015<sup>5</sup>

Along with the steel, pulp & paper and chemicals industries, the European Portland cement & lime sector receive a large number of free allowances relative to their emissions because they are deemed to be at risk of carbon leakage. They have been eligible to receive 100% of their benchmark EUA application during Phase 3. Under a number of Phase 4 reform proposals put forward by the Commission or in Parliamentary amendments, sectors at risk of carbon leakage would be tiered, with the cement sector placed in the top tier of carbon leakage risk.



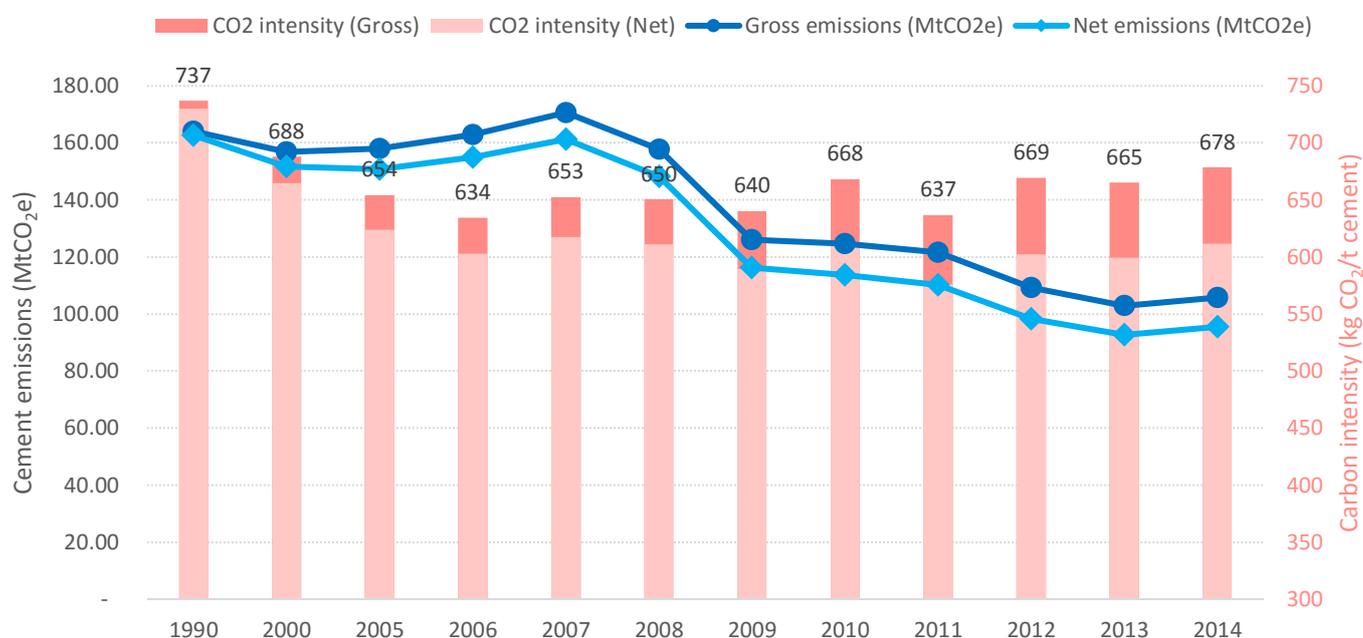
Breakdown of EU ETS free allocation to industrial sectors in 2015<sup>6</sup>

<sup>4</sup> Data from the EU Transaction Log (EUTL)

<sup>5</sup> Data from EUTL, Sandbag calculations

## Why is cement's emissions intensity increasing?

Progress towards reducing the carbon intensity of cement-making in the EU has stalled. Industry leaders frequently point to their operations being amongst the most efficient in the world and yet specific emissions for cement produced in the EU have risen since the EU ETS began in 2005, from 654 to 678 kilograms of CO<sub>2</sub> per tonne of cement<sup>7</sup> (see pink bars in chart below). This means that EU cement producers have become less carbon efficient during the nine-year period after the EU ETS began whereas, globally, the trend has been the opposite; towards *increasing* efficiency (see Appendix III).



Cement emissions and carbon intensity in the European Union.  
(Absolute emission values exclude emissions from on-site power generation)<sup>8</sup>

### GROSS AND NET EMISSIONS ACCOUNTING

Net GHG emissions-intensity from cement making has fallen since 2005 whereas gross emissions-intensity has risen. This discrepancy arises due to a difference in accounting for emissions from the combustion of alternative fuels such as tyres and industrial waste in cement kilns. **Net emissions accounting discounts CO<sub>2</sub> emitted from burning alternative fuels.** Over time, some fossil fuels have been replaced by alternative fuels, hence the decrease in net emissions. The justification for discounting emissions from alternative fuels is based on the logic that, if alternative fuels were not burned in cement kilns, they would instead be landfilled and would produce CO<sub>2</sub> anyway.

**Net emissions accounting has been misused by the EU cement sector to give the impression of making progress towards reducing emissions.** Countries with progressive landfilling policies and waste management infrastructure already create incentives for recycling or energy recovery by levying taxes on waste-producers (see Appendix II).

**The EU cement industry is targeting a 32% reduction in its carbon footprint by 2050 with total reductions as high as 80% if carbon capture and storage is used<sup>9</sup>.** The EU cement sector has yet to provide details on how it proposes to finance and deploy CCS to meet its 80% target.

**However, even the 32% target will be impossible to meet without wholesale changes to both EU policy and the strategies of cement businesses.**

<sup>6</sup> Data from EUTL, Sandbag calculations

<sup>7</sup> Cement Sustainability Initiative. 2014. Getting the Numbers Right data ([link](#))

<sup>8</sup> Data from GNR, 2014. Sandbag calculations based on datasets 21TGWcm and 59cTGW

<sup>9</sup> Cembureau. The role of cement in the 2050 Low Carbon Economy ([link](#))

## International competitiveness

Under the EU ETS Phase 3 carbon leakage criteria, the cement sector, along with most other industrial sectors, falls within the group of leakage exposed industrial activities. This means that under the existing binary approach to carbon leakage protection (fully exposed vs fully not exposed) the sector qualifies to be insulated from carbon costs that are not faced by competitors outside the EU ETS region. Since the publication of Sandbag's report on the cement sector<sup>1</sup> earlier this year, new information has come to light which supports Sandbag's findings. It reveals that EU cement producers have not experienced loss of competitiveness and have very little risk of experiencing carbon leakage. This is covered in more detail below.

### CARBON PRICING

Energy intensive industries in the EU consistently argue that exposure to carbon pricing would result in investment leakage.<sup>10</sup> However, independent analysis shows that **the carbon price has a negligible impact on competitiveness in the cement sector**.<sup>11</sup> Moreover, environmental compliance schemes for carbon intensive industries are now being implemented, or already exist, in many regions globally, reducing the relative impact of the EU ETS carbon price on competitiveness in the EU.

**The energy intensive industrial lobby has a strong track record of crying wolf at legislative proposals designed to protect the environment and past claims around the impact of legislation on competitiveness have been greatly overstated.** For example, in 2012 the Alliance of Power Intensive Industries warned of an "enormous risk of de-industrialisation" in Europe should power prices increase because of the EU ETS.<sup>12</sup> In Phase 3 of the EU ETS most sectors were eligible to receive 100% of their benchmark application for free allocation which led to windfall profits for some large cement manufacturers while power prices fell and the threat of *de-industrialisation* proved non-existent. Policymakers should be aware of the precedent set by the industrial lobby for alarmist and unsubstantiated pronouncements.

### COSTS

Increases in the cement industry's principal costs (labour, raw materials, fuel and electricity) have been largely matched or outstripped by increases in the price of cement. According to a 2013 report by the Boston Consulting Group, commissioned by Cembureau, principal costs for the cement industry rose by 6-26% during the period 2007-2011<sup>13</sup>. However, in the UK, the cement price index rose by 28% between during the same period<sup>14</sup>. In some Member States industries can also receive compensation for indirect carbon costs passed through via electricity prices. However, data on Member State compensation to industry for indirect carbon costs is not publicly available. Furthermore, during the period 2009-2012, many large cement companies, including Lafarge, Cemex, HeidelbergCement, Italcementi and Holcim profited from the EU ETS by selling spare EUAs<sup>15</sup> although the excess allowances they sold could not be attributed to the companies' efforts to reduce specific emissions from cement<sup>16</sup>.

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<sup>10</sup> Cembureau. The cement industry is exposed to carbon leakage regardless of the assessment method used and the relevant product level ([link](#))

<sup>11</sup> Boutabba, M. A., & Lardic, S. (2016). EU Emissions Trading Scheme, competitiveness and carbon leakage: new evidence from cement and steel industries. *Annals of Operations Research*, 1-15.

<sup>12</sup> EurActiv. (2012). EU considers industries exposed to 'carbon leakage' ([link](#))

<sup>13</sup> Boston Consulting Group. (2013). Cement Industry: A Strategic Contributor To Europe's Future ([link](#))

<sup>14</sup> Sandbag calculations based on data from BEIS - Building materials and components: monthly statistics ([link](#)); The National Archives – Construction Materials Archive ([link](#)).

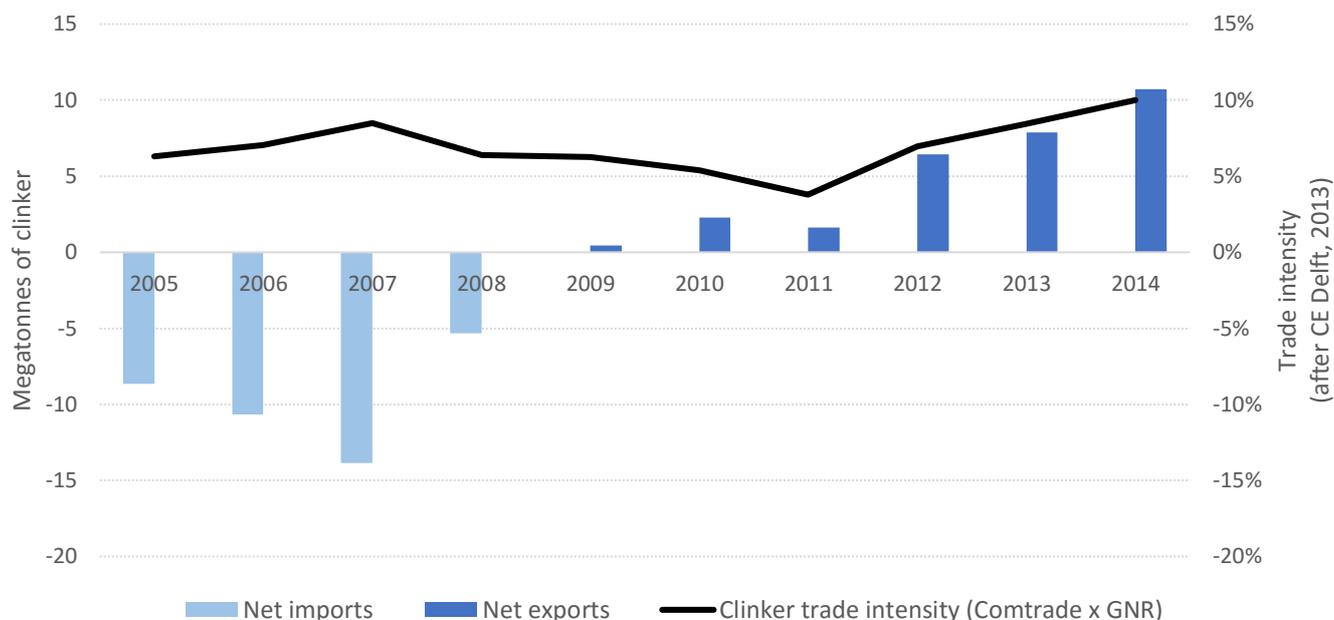
<sup>15</sup> Climate Strategies. 2014. Carbon Control and Competitiveness Post 2020: The Cement Report ([link](#))

<sup>16</sup> Branger, F., Quirion, P., & Chevallier, J. (2013). Carbon leakage and competitiveness of cement and steel industries under the EU ETS: much ado about nothing.

## TRADE

Sandbag's analysis of United Nations Comtrade statistics shows that the European Portland cement industry now exports large quantities of Portland cement clinker to non-EU destinations such as North Africa and Latin America.

**The ability of European cement producers to sell their products in markets outside the EU is not reflected in assessments of the sector's leakage vulnerability.** This is because the trade intensity criterion is a function of total traded volumes and cannot distinguish between imports and exports. Consequently, any company that exports a lot of clinker from the EU to non-EU destinations will receive a sizeable portion of the free allowance allocation because they appear to be more carbon leakage exposed. They are not.



EU Portland cement clinker trade with non-EU countries<sup>17</sup>

Unless the leakage assessment is updated to account for the direction of trade, European Portland cement makers will continue to be over-allocated allowances in Phase 4 of the EU ETS. That means fewer allowances will be available to other industrial sectors whose access to a finite pot of free allowances would be curtailed by the cross sectoral correction factor.

**Ensuring that European cement producers receive a fair share of free allocation means fixing the carbon leakage criteria** such that it reflects the extent of exposure to carbon leakage risk.

## Low-carbon innovation

Several major cement manufacturers have run projects to develop low-carbon cement products but these have not achieved widespread deployment. Examples include big budget schemes such as Lafarge's AETHER® cement (€2.3m, EU-funded), Norcem's carbon capture and storage (CCS) demonstration project in Brevik, Norway (€11.7m, 75% state funded) and LEILAC, a carbon capture project in Lixhe, Belgium which recently completed a pre-feed study (€21m, 57% EU Horizon 2020 funded).

In contrast, SMEs (e.g. Ecocem, EMC, CarbonCure, BanahCEM) have already commercialised techniques for large scale manufacture of cement products that have a small fraction of the embedded carbon of the equivalent volume of Portland cement. These organisations did not receive equivalent levels of public funding to develop their technologies but have made a greater contribution to reducing emissions from cement.

<sup>17</sup> data from UN Comtrade, GNR 2014

Sandbag's report<sup>1</sup> on the cement sector in March highlighted several of these innovative technologies for reducing cement emissions. Many novel cement products incorporate industrial wastes, geopolymers or natural pozzolans. The resources required to produce some form of low-carbon cement are distributed widely across the EU.<sup>18</sup> Furthermore, both the cost of producing low-carbon cement alternatives and their performance are comparable to Portland cement.

Companies that produce non-clinker cements are excluded from the EU ETS and therefore cannot be rewarded for cutting emissions and are worse off than their competitors in the EU ETS by virtue of the fact that they do not receive more free allowances than are needed to cover their emissions. Product standards for cement and concrete (EN197 and EN206) also create arbitrary compositional requirements for these products which makes it hard to certify innovative cement products for the European market. This disparity in the treatment of new entrants vs incumbents stifles innovation and favours the manufacturers of polluting products over those producing cleaner alternatives.

## Ambition from European policymakers

The EU ETS cement sector has, over the course of the scheme, become more polluting. There is evidently a need to fix EU ETS policy such that it drives cost effective emissions reductions in the cement sector in order to fairly contribute to EU emission reduction targets. Sandbag has analysed the performance of the EU ETS cement sector and affecting policies and, based on the findings, has developed a set of policy recommendations to avoid another decade of lost opportunities to reduce emissions from cement:

### EU ETS

- Adopt a targeted approach to carbon leakage protection for Phase 4 to ensure that industries are given an appropriate level of protection according to the extent of their exposure to carbon leakage risk. Particularly given the strong evidence of sectoral differences in exposure to leakage risk;
- Ensure that European cement producers within the EU ETS are treated no more favourably than those that operate in the EU but are not included in the EU ETS; and
- Revise the trade intensity criterion in the carbon leakage assessment methodology to ensure that free allocation is distributed in a manner that is appropriate to the evidence of leakage during Phase 4.

### Product standards & compliance

- Restore competitiveness to the European cement sector by engaging with European Committee for Standardisation (CEN) to amend arbitrary product compositional requirements in cement (EN 197) and concrete (EN206) standards which create artificial barriers to market for alternative cement makers. In the interests of consumers, these should be replaced with standards based solely of the performance of the cement or concrete; and
- Set requirements for industry to reduce the clinker ratio in all cements to less than 65% by 2030.

### Funding

- Ensure appropriate level of Innovation Fund and Horizon2020 funding for commercialisation low-carbon cements; and
- Create policy to support public procurement of low-carbon cements – Member State public purchasing must source an increasing percentage of low-carbon cement.

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<sup>18</sup> R. Snellings. (date unknown). Supplementary Cementitious Materials: Occurrence & Properties. *EPFL* ([link](#))

## APPENDIX I: Europe's Portland cement plants

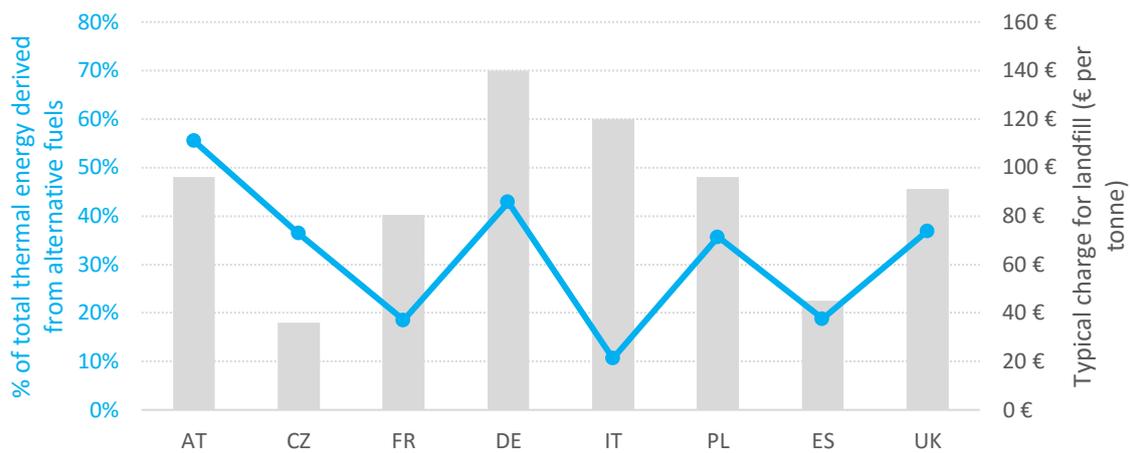
...but who are the best performers?



Location of EUETS Portland cement plants (the size of circles indicates the relative magnitude of emissions)

data from EUTL

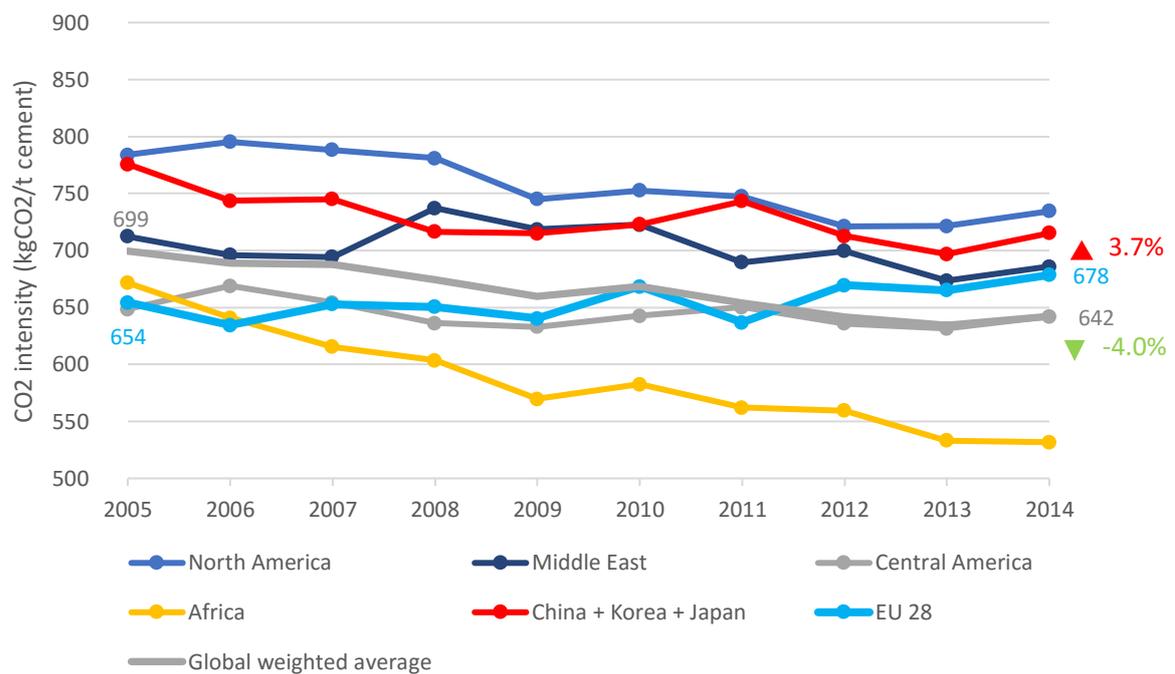
## APPENDIX II: Landfill taxes & alternative fuels use in Europe



2012 Alternative fuel consumption (% of total thermal energy consumption in cement kilns), blue; and landfill charges for 8 Member States

data from GNR 2014, Bio Intelligence

## APPENDIX III: Global & regional carbon intensity of cement



Regional carbon intensity of grey and white cement

data from GNR 2014

## About this briefing

We are grateful to the European Climate Foundation for helping to fund this work. Full information on Sandbag and our funding is available on our website ([sandbag.org.uk](https://sandbag.org.uk)).

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With support from Patricia Buckley, Phil MacDonald, Adam Whitmore & Boris Lagadinov

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The logo for Sandbag, featuring the word "sandbag" in a bold, lowercase, orange sans-serif font.