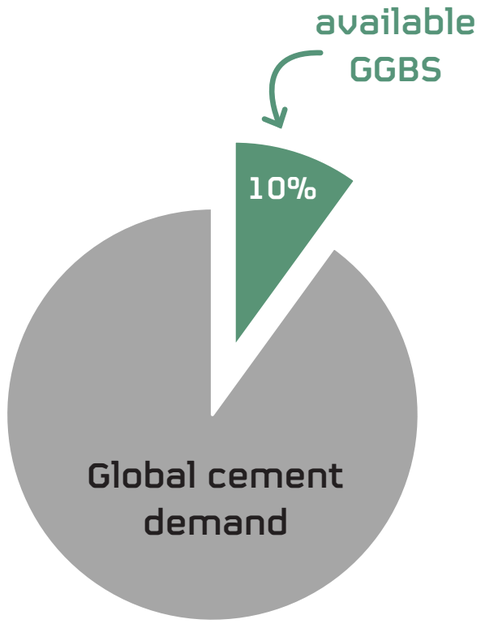
Availability and use of GGBS

The current picture

GGBS, a co-product of steelmaking, is used as a cement replacement to improve durability and/or reduce embodied carbon of concrete. As a co-product of another industry, it is not made to supply demand, but it has value and is a globally traded commodity. It is made worldwide; top producers are India, China and Japan. China uses all its own supply, India exports a small fraction, and Japan exports over half its production. The UK makes some locally but imports at least half its supply, 80% of which comes from the EU and the remaining 20% from Japan and India.

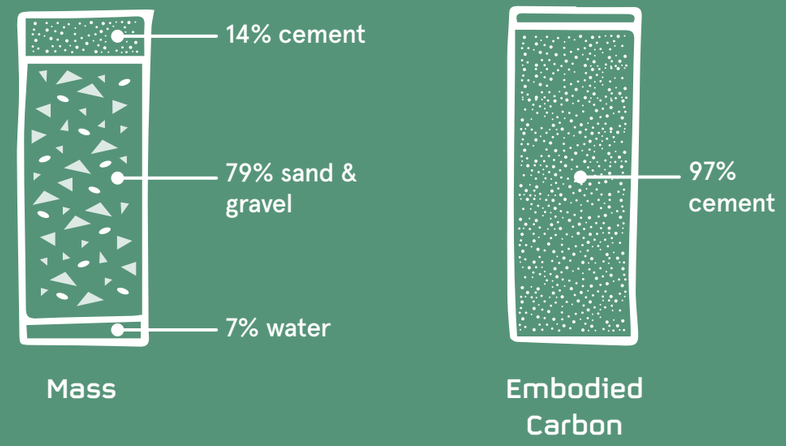
What is the issue?

GGBS can meet only 10% of global cement demand, and this proportion is expected to remain the same until 2030. Worldwide, GGBS is a constrained and fully utilised resource: processing blast furnace slag into GGBS requires investment, which follows global demand. It also loses reactivity in contact with moisture so is not suitable for speculative production or stockpiling. Any increase in GGBS use in one location is likely to reduce use elsewhere. Using large quantities of GGBS can reduce a project's embodied carbon emissions but not global emissions.



In the UK we do not expect GGBS availability to suddenly plummet, but current rates of use do not add up. The problem will arise when exporting countries increasingly use their own supply, as global bodies like the International Energy Agency push for investment, legislation and revision of standards to increase uptake of cement replacements globally. We don't know how quickly this will happen but as governments, local councils and the private sector are increasingly under pressure to reduce emissions, we should expect this to happen and should be prepared for it.

GGBS has risen in cost and in late 2023 was 15-20% more expensive than Portland cement. On average across HTS projects (with and without concrete in the superstructure), adding 50% GGBS to a structure reduces the structural upfront (A1-5) embodied carbon by 20%, and consequently reduces the whole building WLC by about 10%.



What are we doing about it?

At HTS we have been debating this topic through our internal technical forums, not only to make sure we fully understand the issue but also to establish our response to it. There are many different opinions, which is understandable given how recent the issue is but also the level of abstraction – as yet, there is no real industry pressure forcing us to make hard decisions.

We are proposing to limit GGBS to 25% in accordance with the RICS Whole Life Carbon methodology V2 for early-stage carbon reporting. We are also proposing to achieve a minimum of 20% average across each project. We hope this will limit overuse, but also allow for local increases when required for technical reasons (e.g. foundations, for durability, crack and temperature control) if balanced out across a project. 20% is in effect twice our fair share – as a high-use nation, this should in theory avoid a sudden drop in demand and use. We must ensure full GGBS utilisation in the short term. If required on an individual project basis, we will support the option to increase to a maximum of 50-70% by client request, following discussion to communicate risks and benefits and with supply chain confirmation in later stages.

Using multicomponent cements (e.g. limestone fines now, and calcined clays and other replacements as they become available) will help mitigate the embodied carbon impact of limiting the use of GGBS. This, combined with demand reduction, early engagement with the supply chain and looser specification of concrete mixes, should be the new way of using concrete in buildings, as many in the industry advocate.