

Embodied Carbon

The construction, maintenance and use of buildings generate around a third of carbon emissions globally. Furthermore, the industry is responsible for one half of raw material extraction and a significant amount of replacements and transfers of mass during a product's life. Our sustainability team has market-leading expertise in calculating the embodied and whole-life carbon emissions of buildings. The results of these assessments are used as a mechanism to support evidence-based low-carbon design

Our Approach

As businesses, governments and consumers develop environmental awareness and sensitivity, we are seeing the focus of environmental impact reduction shifting to the industries responsible for the greatest impacts of which construction, maintenance and use of buildings and civil engineering works are a significant proportion; generating around a third of global carbon emissions.

While operational carbon emissions for buildings have been quantified in various forms for a number of years, quantifying carbon emissions associated with procuring assets is relatively immature. Undertaking a Life Cycle Assessment (LCA) of embodied carbon provides the means for quantifying the carbon impact of an asset over its lifespan on the basis of material extraction, product manufacture, transport and installation, and disposal of building elements.

We undertake LCA as early in the design

process as possible to ensure the outputs can be effectively utilised by the design team as they are developing options. Our approach explores the impact of all major building elements to the level of detail available, with particular focus on superstructure, sub-structure, hard landscaping and building services options.

The assessments of superstructure, sub-structure, hard landscaping and building services options can be undertaken in isolation to provide direct comparison and then combined to provide a full picture of the embodied carbon impact of a whole scheme.

Our LCA tool- OneClickLCA- integrates seamlessly with REVIT, allowing our designers to test proposals in a live 3D environment as they're drawing. The analysis provides graphical outputs for easy interpretation across the impact boundaries over the whole building life-cycle, in accordance with BS EN 15978:2011.

We have recently revised our Sustainability Policy to set an ambition to assess and capture the embodied impact of all of our major projects. To enable this, we are rolling out OneClick Planetary, a free-to-use platform that all of our designers have access to and can use to test basic embodied impact parameters.

It is important to acknowledge that the outputs from LCA are a product of the accuracy of the inputs, and a number of (consistently applied) assumptions are made about processes and supply chains. It is, however, very effective in drawing comparisons between different design options such as material type or elemental build-up which can then inform the overall design.

Once embodied carbon calculations have been completed, we can link these to operational carbon calculations to inform our whole-life carbon analysis, including renewable energy and offset burdens.

Our Experience



AstraZeneca Global HQ



Launchpad Southend-on-Sea



Gap House