

Information Paper

Advances in construction life cycle assessment through building information modelling

An introduction to IMPACT

Daniel Doran

For over a decade BRE has played a key role in assessing the environmental impact of construction. During this time interest in life cycle assessment (LCA), often known as 'embodied impacts', has increased markedly among building designers, who recognise that impacts from buildings extend well beyond the operational energy uses of heating, cooling and power.

There is an increasing understanding that we live in a finite world requiring better resource efficiency. This has become evident through an explosion of events, media coverage, new consultancy services and numerous new tools. At the same time, the construction industry has begun gearing up for building information modelling (BIM), where three-dimensional drawn information and meta-data (such as construction product information) are integrated into a single model. The combination of these two significant changes has paved the way for BRE and three other partners to produce IMPACT: a method designed for building-level LCA and life cycle costing.

This Information Paper focuses on the environmental aspects of IMPACT. It begins by introducing the IMPACT project and LCA from the perspective of a building designer. This is followed by a review of the key themes and advantages of building-level LCA including BIM, building-level comparison and integration into the BRE Environmental Assessment Method (BREEAM; www.breeam.org). After reading this Information Paper, readers will gain a crucial understanding of how BRE is approaching BIM life cycle assessment, and how it is implemented through IMPACT.

IMPACT

IMPACT is a specification developed for calculating the environmental impacts of a building over part, or all, of its life. It is particularly intended for implementation within BIM tools,



Figure 1: The IMPACT logo

where user input integrates best with existing workflows. IMPACT works within other tools to report on the environmental impact and cost of a building over its life.

The IMPACT project is led by BRE, in partnership with Integrated Environmental Solutions Ltd (IES), WD Rethinking Ltd and AEC3 (UK) Ltd. The project was officially supported by the Construction Products Association, Faithful+Gould, RIBA and NBS, who acted as advisers during its development. IMPACT was part-funded by the Technology Strategy Board and was arranged into two phases:

- Phase 1: Development of the IMPACT method, data and production of the first IMPACT Compliant tool (by IES).
- Phase 2: Production of the publicly available IMPACT Specification to facilitate further implementations of IMPACT by other software developers (subject to a licencing agreement). Phase 2 is due to complete in October 2013.

IMPACT has been designed primarily for architects, interior designers, specifiers, structural engineers, landscape architects, quantity surveyors, constructors, specialist consultants, environmental managers and any other professionals who influence construction specification.

An overarching aim of the IMPACT project is that, through the widespread use of compliant software applications, the resulting industry-wide improvements in transparency and comparability of LCA results will encourage and enable construction project teams to consider whole-life impacts as a routine design activity.

