BECD

Built Environment Carbon Database

Philosophy and Programme

November 2021

BECD.co.uk

Introduction

This paper has been prepared by a consortium of professional bodies and organisations operating across all aspects of the UK built environment.

Globally, the built environment is estimated to account for 38% of total carbon emissions[1]. This includes 'embodied carbon' and 'operational carbon' emissions. Embodied carbon (approximately 10% of global emissions) includes the 'upfront' carbon emissions from the construction process as well as the carbon associated with the life cycle of the entity, i.e. maintenance, retrofits, and end of life.

Measurement and reporting of embodied carbon are not universally mandated on construction projects. Where it is undertaken, 'what' is measured and 'how' it is measured are not consistent - meaning we cannot be confident we are making the right choices to drive toward net zero. This inconsistency also means that it is not easy to compare, improve and learn from other projects.

Measurement and reporting of operational carbon are more established in practice and regulation, but firms and policy-makers need more accessible, transparent and up-to-date benchmarks to compare and track operational performance.

[1]Global ABC, 2020. Global Status Report for Buildings and Construction. Available: Globalabc.org

In the view of the consortium, to drive down the impacts of the built environment we need:

- A mandate or driver for all construction projects to undertake a whole-life carbon assessment
- A consistent (and cost effective) way of measuring and reporting those whole-life carbon emissions
- A consistent set of data to support the assessments
- A consistent set of data to benchmark construction performance and set targets
- A suitably trained and qualified workforce to undertake the assessments.

There are activities in motion within the industry to address how to drive the requirement for whole-life carbon assessments (e.g. The Government Construction Playbook, the proposal for Building Regulation Part Z, the UK GBC Net Zero Whole Life Carbon Roadmap, and the ICE Carbon Project), and consistency in methodology (e.g. the RICS Professional Statement on Whole Life Carbon Assessment, the PAS2080, the IPA "Best practice in benchmarking" guidance, and the CIBSE TM65). This drive for improvement is fully supported by the BECD consortium.

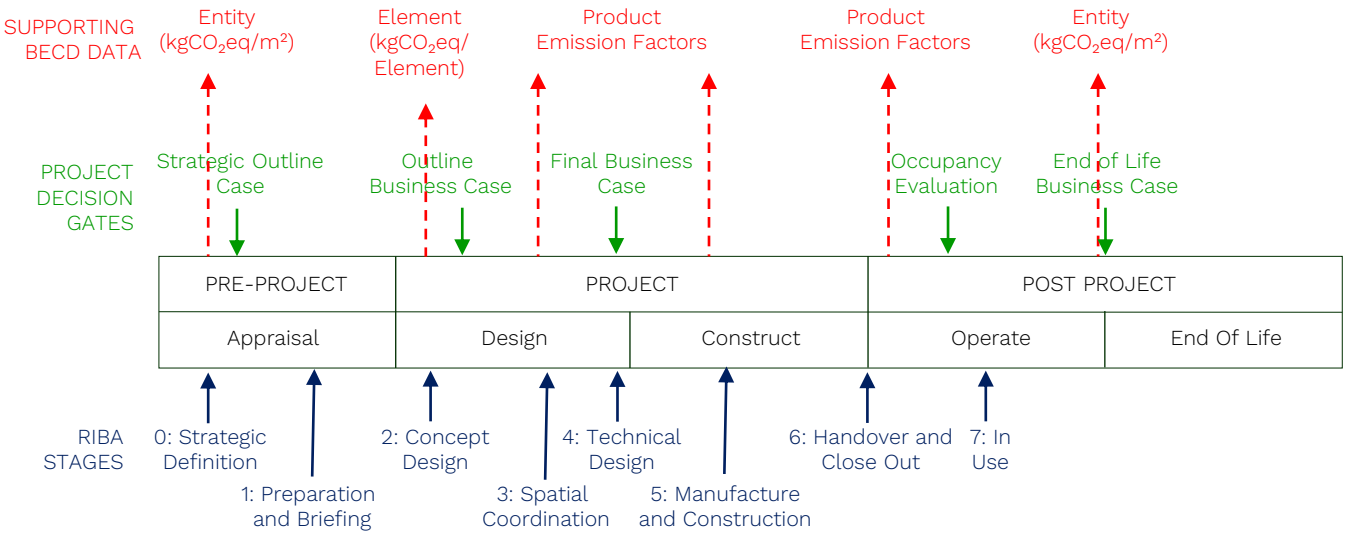
It is recognised by this consortium that for a sustainable future we need to drive towards net zero carbon emissions across the UK built environment and that a lack of available and consistent data is one the main barriers that remain unresolved. This paper sets out our vision and commitments in removing this barrier.

What data do we need?

Data is required at different stages for different purposes. The following graphic represents a simplified view of the life cycle of a construction project. Carbon emission data is required at the following stages:

- Feasibility – usually high-level data required to help estimate different options to appraise the feasibility of a scheme (e.g. typical kg of CO_2-equivalent per m^2 for embodied carbon and kg of CO_2-equivalent per m^2 per year for operational carbon)
- Early Design – usually element-level and component-level data to appraise different design options and pick the best performance over the life of the built entity
- Evolving Design – generic product data to appraise design options for embodied carbon
- Detailed Design – generic and manufacture-specific product-level data to appraise different products and understand their embodied impacts
- Construction – detailed product-level data to appraise options due to variations during the construction phase
- Operational – typical benchmarks for operational carbon, and more detailed product-level information to appraise embodied carbon options when components need replacing
- End of Life – usually generic and product level data required to help estimate embodied carbon and appraise the available options (retrofit, alterations or demolition)
- Life cycle data – expected life spans and maintenance cycles of products and elements.

Project Life Cycle



What are we doing about it?

The consortium acknowledges the need to align reporting practices and bring together existing data in a single location, which should be free to access, easy to use, and should act as the main UK platform to store new carbon assessments and generate both project-level and product-level benchmarks.

The consortium is therefore designing and developing two sections for the Built Environment Carbon Database (BECD). The first section contains data at entity level, providing benchmark-type data points to support the feasibility, early design and end of life stages. The second one contains data at product level to support the evolving and detailed design, construction and operational stages, and provide good-quality product data to conduct reliable assessments.

Both database sections will be fully digital to allow data import and export through appropriate data formats and dedicated APIs. Data input by professionals conducting carbon assessments is essential for the BECD to remain up-to-date and relevant, but this will need to be supported by validation procedures to ensure the data is reliable.

Section 1: entity-level data

This section will store whole-life carbon emissions assessed at the level of built environment 'entities' - buildings and infrastructure (including transport, energy systems, communications, water, waste and ecosystems support services) and will structure the data according to the EN15978 and EN17472 standards (including both embodied and operational emissions). It will be capable of capturing existing carbon datasets (such as the RICS Building Carbon Database), assessments submitted with planning applications (such as those submitted to the Greater London Authority), and any other assessment conducted at entity level.

For each entity, users will be able to report carbon figures assessed at three project stages: early design, detailed design, and post-completion. Each set of carbon figures will be subdivided into entity elements (e.g. structure, finishes, etc.) as well as life cycle stages. Users will also be able to generate custom benchmarks based on their selection of entity types, elements, life cycle stages, data quality, etc., and compare their own projects against relevant benchmarks.

By bringing data together and providing a clear and consistent framework based on the established standards, the entity section will drive the harmonisation of carbon assessment and reporting across the UK built environment sector.

Section 2: product-level data

This section will store whole-life carbon emissions assessed at the level of construction materials, products and works, and will organise the data according to the EN15804 standard. The data will be classified by assessment type, allowing users to input and retrieve carbon figures obtained through industry-generic and product-specific Environmental Product Declarations (EPDs). We are considering introducing a confidence score to help users understand data provenance and robustness. Ideally, generic data identifying typical carbon ranges for construction products should exist alongside specific data released by manufacturers for each of their products, but this is not the case for many products yet. For this reason, the BECD product section aims to capture all available verified data while providing users with the means to consider data quality and appropriate use.

Classification by object type (e.g. dense concrete block) will enable users to generate typical embodied carbon ranges for construction products and works.

By bringing data together and allowing easy comparison between options, the product section will help designers and contractors in the choice of products with low embodied carbon, as well as drive manufacturers to improve their products and provide updated and detailed EPDs.

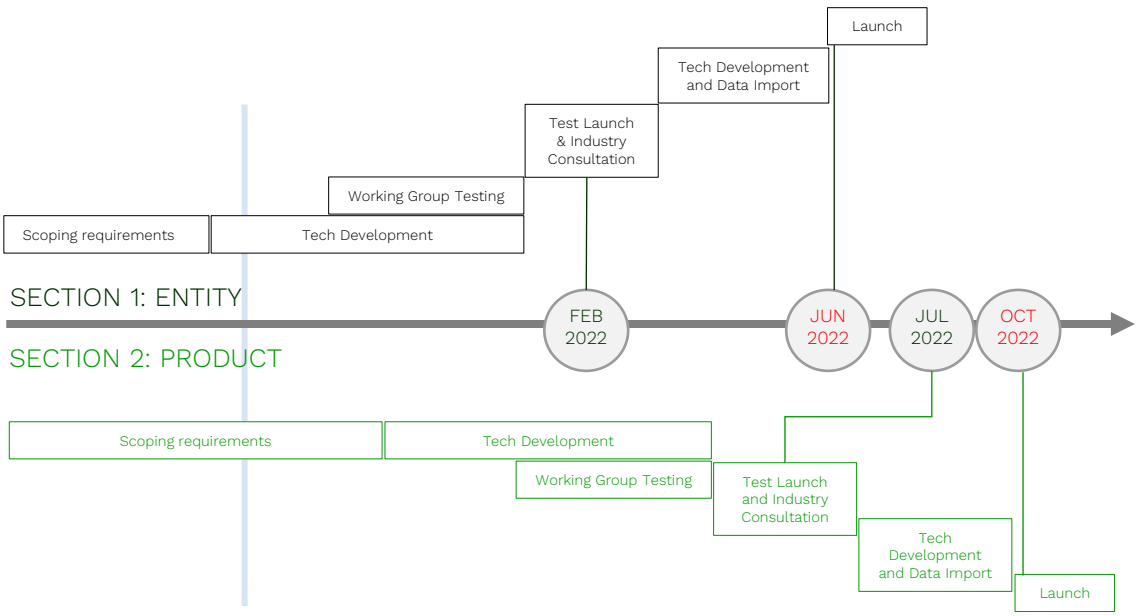
When will the BECD be available?

The technical details of the two database sections are being developed by two Working Groups, comprised of built environment professionals with experience of carbon assessment and database creation. Both sections will be launched in progressive stages, to allow users to get acquainted with the digital platform and provide feedback on functionality and user experience.

The first stage of the entity section will be available in the first quarter of 2022, and will comprise building data imported from a range of existing sources. The first stage of the product section is planned to be launched in the third quarter of 2022, and will comprise product data imported from existing EPDs and other LCA sources, such as the Inventory of Carbon and Energy.

In the meantime, existing data sources such as the RICS Embodied Carbon Database, the Inventory of Carbon and Energy, and BRE Impact will continue to be available for use.

Timeline for development and launch



What are the consortium parties committing to?

All parties in the consortium are represented in the Steering Group that is overseeing the development of the BECD, and have committed to promote its use across their membership. In particular:

RICS is already regulating all members conducting carbon assessment against the 2017 Professional Statement "Whole life carbon assessment for the built environment". A revised version of this Statement is planned for publishing in early 2022. The revised Statement will mandate the use of BECD throughout its members.

The Carbon Trust works with leading organisations across the whole built environment value chain, from infrastructure asset owners to real estate asset managers and from house builders and commercial developers to main contractors and construction product suppliers. Decisive action requires reliable data and the launch of the BECD will be a turning point in unlocking the UK's rapid transition to a thriving, sustainable, net zero built environment and we're committed to playing a key role in driving the development, promotion, and the widest possible consistent use of the BECD to deliver this change.

The expectations of building performance are rightly rising, with increasing emphasis on energy performance and the impact on welfare. If the industry is to fully understand how well it delivers in practice, then access to better quality data is essential.
The BECD offers the industry a consistent source of carbon estimating and benchmarking for the UK construction sector and CIOB are committed to playing a key role in promoting its consistent use amongst our members and the wider industry.

BRE understand the importance of data in reducing the environmental impact of the built environment and are committed to playing a key role in sharing data and experience and promoting the widest possible consistent use of the BECD to the wider industry.

The RIBA understands the importance of data and benchmarking in delivering sustainable outcomes and working towards net zero whole life carbon and we are committed to playing a key role in the development of the BECD for our members and the construction industry's widest possible consistent use.

IStructE

At the Institution of Structural Engineers, we will commit to advocating that our members utilise the Built Environment Carbon database on every project that they work on both to help them estimate the carbon footprint of the project itself and then also share that information with the wider industry.

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The Institution of Civil Engineers recognises the importance of meeting the climate challenge which is why it has place decarbonisation and resilience at the top of its strategic agenda. We will be encouraging our members and the industry more widely to make use of the Built Environment Carbon Database and to play their part in this generation defining challenge.

How can you support and stay connected?

Once launched, both databases will be accessible through the website becd.co.uk.

Meanwhile, you can use this website to register your interest to be informed about the development process as well as your willingness to share data to be integrated in the database. This website will also host BECD promotional material and updates on the progress of the Working Groups.

For more information visit BECD.co.uk