

A Call to Action:

**How embodied carbon accounting plays
a crucial role in the sustainability of the
construction industry**



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A CRISIS AND AN OPPORTUNITY

The global construction industry has just begun to bounce back from the depths of the pandemic, but the challenges seem unlikely to lessen in the years ahead. Ambitious greenhouse emission reduction targets have been set around the world to fight the impending climate crisis, and the built environment has been earmarked as an area with significant room for improvement.

It's no secret that the construction sector is a primary contributor to global carbon dioxide emissions. A **report from the United Nations Environment Programme** released in 2021 estimated that almost 50 per cent of total global energy-related CO2 emissions were generated by our sector (including operational emissions).

The report found that direct building carbon emissions must be slashed 50 per cent from this figure by 2030, if we are to get on track for net zero carbon building stock by 2050. The UN Environment Programme has called for a "triple strategy" to achieve these aims; namely, to slash energy consumption in the built environment, decarbonise the power sector, and enact materials strategies that reduce carbon emissions throughout operation phases.

While progress has been made in renewable energy and efficiency metrics, the rate of improvement must accelerate quickly if we are to reach these lofty targets.

On a more positive note, the UNEP's **Emissions Gap Report 2020** found that a post-pandemic green recovery could reduce projected 2030 carbon emission by up to 25 per cent. To achieve this, governments would need to "...systematically include building decarbonisation measures into recovery packages – increasing renovation rates, channelling investment into low-carbon buildings, providing jobs, and increasing real estate value."

Reports such as these foreshadow that stricter carbon-cutting initiatives will be present across the board on private sector projects. Intelligent design and material innovation are a must, especially as our industry is striving to boost productivity as well as sustainability. In this regard, the imperative to slash emissions presents an interesting opportunity to improve in other areas.

Uncovering efficiency and cost gains during construction will be a focus area for quantity surveyors working on major builds. For this, surveyors and other professionals will need to possess a strong knowledge of embodied carbon estimating.





WHAT IS EMBODIED CARBON REALLY?

For those unfamiliar with the term, embodied carbon refers to the all-encompassing CO₂e emissions associated with a service or product. In a construction context, this might be the complete lifecycle carbon cost of a certain type of concrete (manufacture, transportation, installation, maintenance, disposal, etc.).

Quantifying embodied carbon is often a complicated undertaking at a technical level. Several principles and methodologies are available, such as the **Whole Life Carbon Assessment for the Built Environment** delivered by the Royal Institution of Chartered Surveyors (RICS). The RICS methodology breaks down the lifecycle into four stages; Product Stage, Construction Stage, Use Stage and End of Life Stage, with numerous sub-categories beneath each.

While applied methods may vary, the general principles of reducing embodied carbon remain. Existing buildings should be repurposed or re-used wherever possible, while materials should be recycled or re-manufactured as appropriate. Materials selected should be sustainable and low-carbon, and emissions should be offset wherever feasible (through woodland planting, renewable energy tech, etc.)

The holistic embodied carbon approach is a relatively new advent for our industry. By selecting the right materials, methods and design cues, project owners can deliver on builds that are both energy and cost effective in the long-term. In this new world, QS and estimators are a key piece of the puzzle. Top quantity surveyors will soon not only be repositories of knowledge on all things price; they will also have excellent insight on material and design considerations that can slash emissions.

It is likely that forward-thinking project managers will lean on their expertise and involve the QS more in early-stage design and material discussions. Projects that intelligently utilise Building Information Modelling will have an advantage when it comes to analysing embodied carbon.

Team members (including surveyors) can collaborate to assess the long-term energy implications of the structure, materials used and other considerations. This skill requires some technical aptitude, in addition to broad material knowledge. Advanced estimating software is now a standard component of the surveyor's toolkit, and some platforms are intelligent enough to simplify the embodied carbon estimating process.



WORLDWIDE CARBON TRENDS IN CONSTRUCTION

Many federal governments are moving forward with embodied carbon action plans for construction. Continental Europe is leading the charge in 2022, as is often the case on matters of sustainability.

The Netherlands was the first country to introduce mandatory assessment of embodied carbon for non-Government buildings, all the way back in 2018. Sweden and Norway now require embodied carbon assessments on certain projects, while Denmark and Finland are expected to unveil mandatory embodied carbon targets in the next few years.

The United Kingdom is seemingly further behind, although a bill calling for reporting of whole-of-life carbon emissions on major projects was introduced to parliament in early 2022. Australia is also some way off a federal mandate being introduced, although several rating systems for built environment emissions are being prepared for national rollout.

The United States is working on procurement as a key pathway to sustainability, by promoting low carbon building materials within the supply chain. This material approach has been **enacted in eleven US states as of 2021**, which is significant given the scope of the US market.

While some federal mandates are already in action, such as the U.S. General Services Administration's (GSA) new Low Carbon Concrete and Asphalt Procurement standards, and the recently-signed Inflation Reduction Act (designed to advanced the low carbon materials market in the U.S.), many others are still in the discussion phase. However, private sector developers and builders are already taking leadership by moving to low carbon materials. By recognising that embodied carbon reduction will be a key consideration for many years to come, these professionals are putting in the work to remain ahead of the curve.

The same is true of estimators and cost consultants, who are hoping to establish a competitive advantage in the field by learning the finer points of embodied carbon estimating now. An increasing number of projects, large and small, will require consultancy on carbon efficiency across different stages of project lifecycles, and many professionals are working to build this skillset as soon as possible.





RIB SOFTWARE'S PARTNERSHIP WITH BUILDING TRANSPARENCY

Industry-wide digital transformation requires technical breakthroughs that facilitate a better way of working. Fortunately, there are forward-thinking professionals and organisations who are working to break down the barriers and establish a greener industry.

One such endeavour is **Building Transparency**, a non-profit organisation that is taking action to address the role of embodied carbon in climate change. Building Transparency is dedicated to uplifting construction through open access data and tools that have wide application across the industry.

Their major service is the **Embodied Carbon in Construction Calculator** (EC3), a "...free database of construction EPDs (Environmental Product Declarations) and matching building impact calculator for use in design and material procurement."

EC3 aids in evaluating the upfront supply chain emissions of construction materials. This is particularly useful to construction material procurers, developers, contractors, and policymakers alike.

By being able to measure the amount of embodied carbon within production materials, these stakeholders are empowered to evaluate a project's overall carbon emissions and utilise that information to procure low carbon material alternatives or, in the case of regulators, set embodied carbon limits. These measures will ensure the industry's compliance and adherence to Environmental, Social and Governance (ESG) sustainable building practices.

EC3 solves a persistent pain point for construction. Traditionally, technical documents reporting on the carbon footprint of a product (EPDs), have been expensive and tricky to produce. For this reason, they haven't always been widely accessible; EPDs are often proprietary, unstructured and in print-only PDF format, mitigating the ability to compare like-for-like. With EC3, thousands of EPDs are now available in a singular and open-source database, empowering professionals such as quantity surveyors to deliver optimal outcomes. Those willing to submit an EPD to the growing database for global use can **contact Building Transparency** directly.

Traditionally, hard-won data in construction has often gone to waste. Concepts such as Building Transparency's EC3 help to harness this high-level data. As each new EPD enters the database, it provides a new benchmark for subsequent projects; thereby creating a snowball effect that may drive a new era of sustainability.

Building Transparency's premier solution is kept free by way of sponsorships with various entities. In April of 2022, RIB Software agreed to a partnership with Building Transparency as a commitment to the future of the industry.

Other open access digital initiatives are being rolled out for the good of construction, based on the reported requirements of carbon-cutting professionals across the globe. Industry bodies play a crucial role worldwide by highlighting the challenges that professionals face and advocating for the best possible solutions. Just as digital collaboration is vital for modern project management, it is imperative that the best minds keep creating technologies and techniques to support delivery of a greener built environment.

HOW iTWO COSTX SUPPORTS EMBODIED CARBON ACCOUNTING

As a market leader in the sustainability space, RIB has built a variety of carbon accounting workflows into the iTWO costX platform.

The headline functionality is the ability to combine both cost estimating and embodied carbon accounting in a single solution; which is a world-first solution.

With the Version 7.0 R2 release of iTWO costX, users can import the aforementioned EC3 embodied carbon rates into the platform with a click of a button. Users simply register for a free account, locate the relevant EC3 embodied carbon rate library from the Building Transparency website, add a relevant code for reference within the notes, and download the data as a Building Elements Report. From here, it's a simple case of importing the resultant Excel spreadsheet into iTWO costX within the Rate Libraries section of System Administration.

Once imported, these detailed EC3 rates will now appear in the left-hand pane of iTWO costX, ready to be 'dragged and dropped' into a worksheet to build out an embodied carbon estimate. Users can interrogate this data in-depth across lifecycle stages, and even produce indicative reports in a matter of minutes that can be passed on to stakeholders. It's not just EC3 rates that can be imported; other pre-existing rate libraries such as those provided by the Royal Institution of Chartered Surveyors (RICS) can be utilised.

Rowan Parris, Embodied Carbon Program Manager at Turner Construction Company (another Building Transparency partner), notes "These tools [iTWO costX and Building Transparency's EC3] add to the resources available to support Turner's efforts to bring innovative, viable solutions to clients who are seeking to reduce the use of carbon intensive materials in their buildings. Through an open, collaborative process, we aim to present project teams with current, technical information to facilitate highly informed decision-making and develop solutions that achieve meaningful reduction targets."

The inherent flexibility of the software means that users can create bespoke workflows that best suit their business. For example, quantity surveyors can take advantage of the user-defined columns and inbuilt functions of iTWO costX to build spreadsheets to the requisite level of detail. A wide selection of sample and template files are available within iTWO costX, helpful for users looking to experiment and find the setup that suits them best.

The embodied carbon functionalities on offer in iTWO costX are developed to suit the pressing needs of an industry that is rapidly changing. RIB's platform is in a constant state of development, and users can count upon more features that align with sustainable building practices in the near future.



AN ACTION PLAN FOR COST CONSULTING BUSINESSES

For organisations that aren't yet up-to-speed with embodied carbon estimating, there are some key considerations to work through before getting started. Evolving your business offering takes time and careful thought; making the right decisions early in the piece can set your team up for long-term success.



APPOINT A SUSTAINABILITY CHAMPION

Many business owners across different industries are appointing leaders within their own teams to spearhead an enterprise approach to sustainability. These 'sustainability champions' are often passionate about environmental concerns and enacting positive change, as well as being detail-oriented and willing to stay up-to-date on best practice.

Within a cost consulting firm that is just getting started with carbon considerations, this person may advise upon the resources, techniques and policies that should guide the new program. While a sustainability champion may come from multiple different departments of a business, they will need to be well-versed in the finer points of estimating to make the right decisions. Having a go-to person within your business to discuss ideas and pursue further research can be invaluable while working to establish a sustainability plan that works for everyone.



ATTAIN A SUITABLE CARBON RATES DATABASE

Earlier in this piece we spoke about the Building Transparency Embodied Carbon in Construction Calculator, which brings together a wide selection of carbon rates within a single expansive resource and is free for all users globally. Despite its worldwide application, there are other carbon rate databases available that your business may wish to consider, depending on your specific requirements and geographic location.

The **RICS Building Carbon Database** is a popular choice in the United Kingdom, while the **Inventory of Carbon and Energy** has more than 30,000 users. There are other databases available with specific rate buildups in countries such as the United States and Australia.

Ensure you conduct detailed research before making a choice, to ensure components, materials objects that your business will typically use on projects are well represented. Most options (such as EC3 and the RICS database) are user-led and constantly improving as new data is added and validated.



ADOPT A FULLY INTEGRATED SOFTWARE SOLUTION

It goes without saying that embodied carbon estimating is complex, and businesses cannot expect to achieve transformative results without a unified software platform for takeoff, estimating and reporting. The days of multiple disconnected platforms are behind us. Quantity surveyors and estimators now manage efficient workflows that eliminate the tedious and time-consuming tasks that were once the cause of so much frustration.

As described earlier, all-in-one software solutions such as **iTWO costX** contain out-of-the-box options for embodied carbon estimating supported by embodied carbon rates such as EC3, with new functionalities regularly added to support our changing industry.

Taking these three initial actions will empower your team to advise confidently on embodied carbon costing, and may help you to establish a competitive advantage within a field that is often slow to innovate.



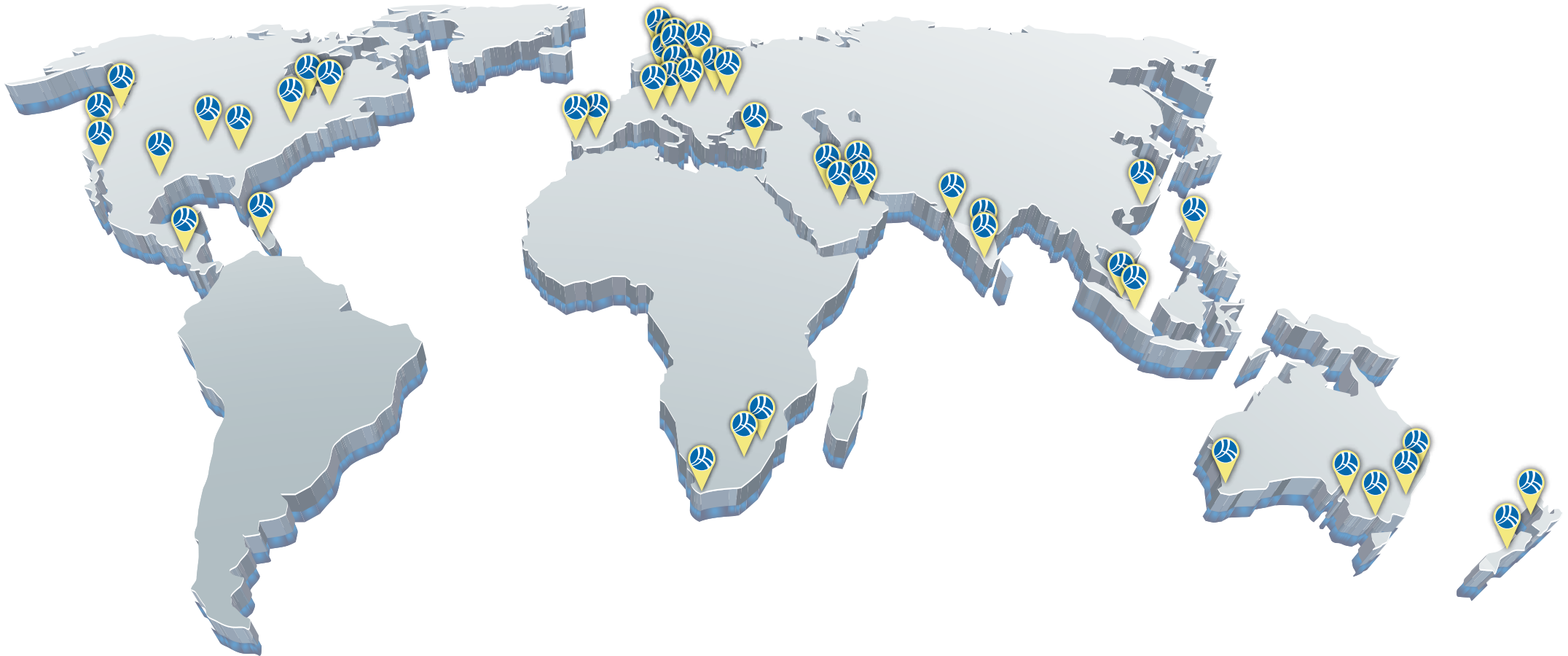
CONCLUSION

Our industry has a daunting task to accomplish in the decades ahead, and it has become abundantly clear that advanced technologies will be key to a new generation of productivity. Innovators in the built environment have solved seemingly insurmountable problems in years past, and they will again as we turn our focus to achieving net zero.

We have a considerable knowledge base to draw upon, and initiatives such as Building Transparency's EC3 will equip leading practitioners with the tools they need. Success will require all stakeholders, from decision-makers through to designers and manufacturers, to incorporate embodied carbon considerations into their best practice.

The industry will be required to heed this call of action with speed and conviction, but with the right technology and tools at their disposal, they will be empowered to act now and help secure our future.

For more information on how RIB is helping companies calculate embodied carbon,
visit www.itwocostx.com.



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