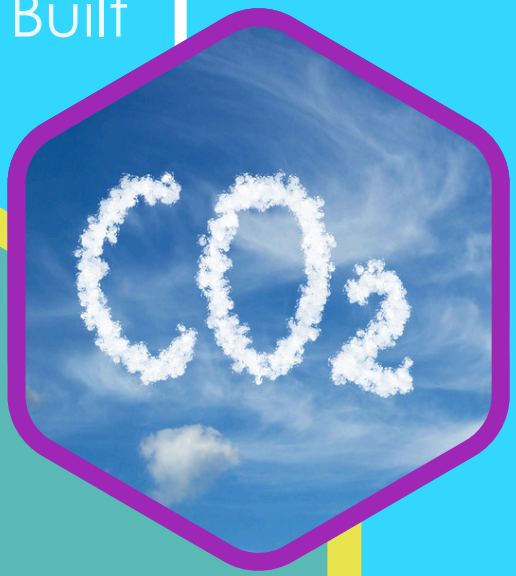
FUTURA BRIGHT

SHAPING A SUSTAINABLE FUTURE

Whole Life Carbon Simplified

A Practical Guide for the Built Environment



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Introduction

In the face of an escalating climate crisis, the built environment has become a focal point for reducing global carbon emissions. Buildings contribute to nearly 40% of global CO_2 emissions, and architects and developers are under increasing pressure to create sustainable, low-carbon structures. But addressing operational carbon alone—the emissions associated with energy use during a building's life—is no longer enough.

Whole Life Carbon Assessments take a more comprehensive view, examining carbon emissions across a building's entire lifecycle—from the extraction of raw materials to construction, use, and end-of-life. This holistic approach allows architects and developers to identify carbon hotspots and make informed decisions that align with sustainability goals and regulatory requirements.

For forward-thinking professionals, whole life carbon assessments represent not just an obligation, but an opportunity: to design better buildings, future-proof projects, and demonstrate leadership in a rapidly changing industry.

Both the RICS Professional Statement and the London Plan put this at the heart of carbon reduction efforts. Whole Life Carbon Assessments (LCA) and Circular Economy Statements are now mandatory for large-scale developments in London.

This e-Guide will help you navigate the complexities of whole life carbon, offering practical insights, actionable strategies, and tools to help you decarbonise your designs and contribute to a more sustainable future.

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What is Whole Life Carbon?

Whole Life-Cycle Carbon (WLC) emissions are the carbon emissions resulting from materials, construction and use over a building's entire life, including demolition and disposal. A WLC assessment provides a suggestive picture of a building's carbon impact on the environment.

1.Embodied Carbon

Emissions from material extraction, manufacturing, transport, construction, and end-of-life disposal.

2.Operational Carbon

Emissions from energy use during a building's operational phase.

A WLCA aids decision making during the design, procurement, construction and use phases of a project, enabling built assets to achieve the lowest carbon impacts across all life cycle stages.

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To fully understand a building's environmental impact, it's essential to consider all lifecycle stages, including:

Modules A1-A5

Product sourcing and construction stage (upfront Carbon)

Modules B1- B7

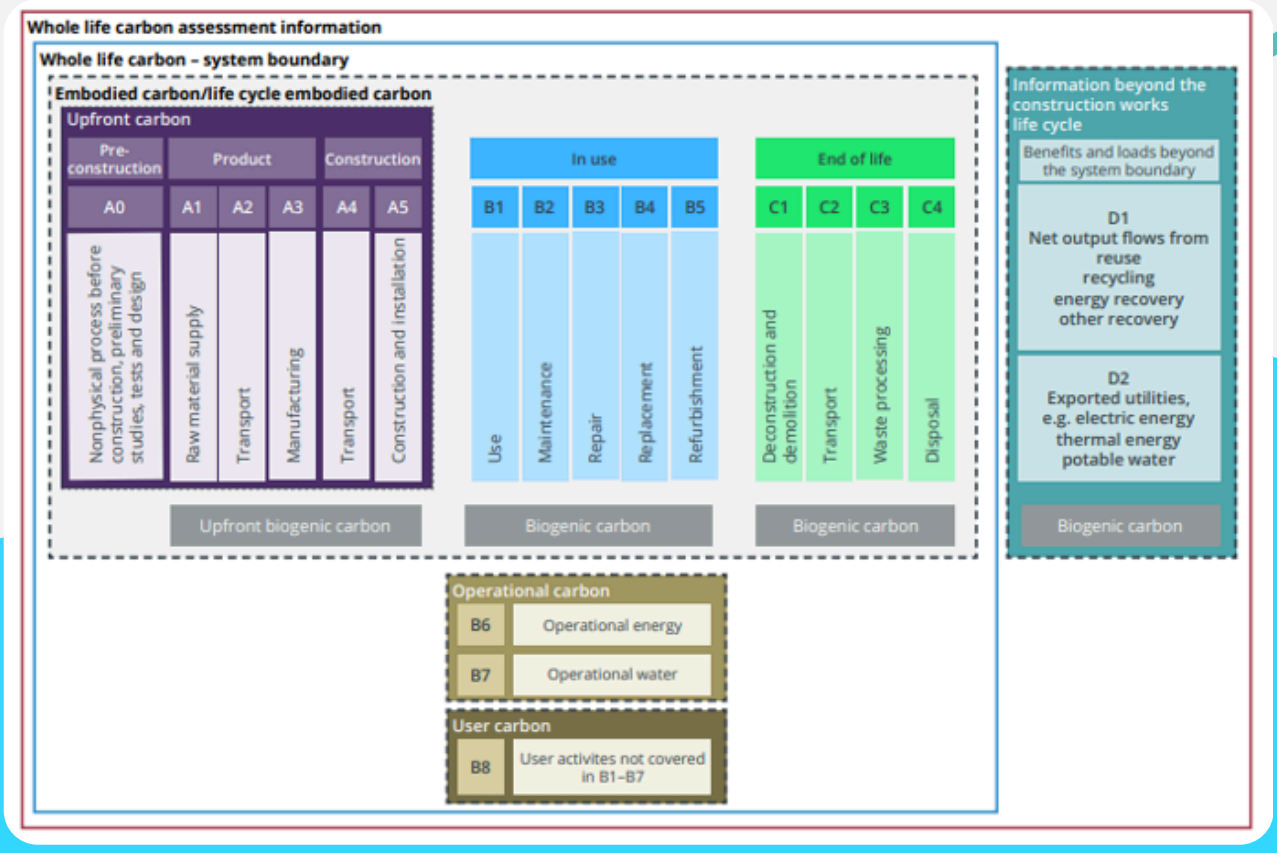
Use stage

Modules C

End of Life Stage

Modules D

Benefits and loads beyond the system boundary



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Why would a project need to complete a WLC Assessment?

- To demonstrate compliance with National and Local Planning policies requirements
- Demonstrating commitment to climate action
- Green finance incentives e.g., EU Taxonomy
- Looking for opportunities to reducing operational costs
- Developer ESG aspirations
- Future proofing

What does this mean for your projects?

Designing a development which follows a WLC approach will ensure key priorities and principles are addressed from the onset and embedded into the design.

Key advantages include:

- Demonstrates carbon accounting – It provides a comparable scenario for future schemes to refer to and understand the likely emissions associated with a building of this typology
- Encouraging resource efficiency principles to be made encourage refurbishment, and the retention of existing materials, buildings instead of favouring new construction
- Informing the team on where carbon savings can be made
- Encouraging a fabric first approach reducing reliance on building services and exploring alternative lower carbon strategies
- Ensuring embodied and operational carbon emissions are considered at the same time
- Allowing for in-use emissions to be understood, and for alternative lower maintenance products and components to be identified for the building's life cycle.
- Prioritising Sustainable and Local Procurement of materials and components
- Encouraging designing for longevity, flexibility, durability to be considered, allowing a building to be designed for future usages, reducing requirement for future demolition.

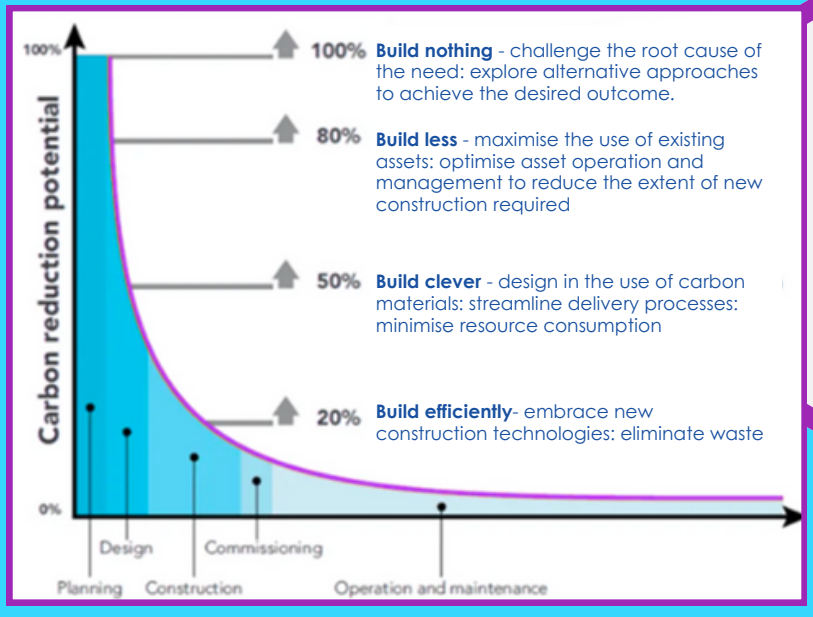
How to conduct a Whole Life Carbon Assessment

WLCAs should be integrated into project planning and cost planning from the outset, developed in collaboration with the wider project team and updated as the project evolves.

WLCAs can be carried out during any project phase, using generic information in the early design phases before evolving to more specific data as the design becomes more developed.

We recommend starting a WLCA at the earliest opportunity in order for informed decisions to be made about the design moving forward, and the opportunity to influence the design is still attainable.

The assessment provides a consistent, and measurable process in terms of understanding how we measure carbon and seek opportunities to reduce carbon. The information collected informs future policy and projects on actual targets likely to be achieved, and aspirational targets to pursue for the future.



This graph highlights the key project stages and how much impact they can have in reducing carbon.

Embodied Carbon reduction potential at different stages of a building project

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Data Collection

When conduction a Whole Life Carbon Assessment, the following building elements information is required:

- Demolition
- Facilitating works
- Substructure
- Superstructure
- Finishes
- Fittings, furnishings and equipment (FF&E)
- Building services/MEP
- Prefabricated buildings and building units
- Work to existing building
- External works

Perform the Assessment

Use tools like OneClick and LCA to calculate embodied and operational carbon based on the collected data.

WLC assessments are carried out in line with BS EN 15978: 2011 (Sustainability of construction works — Assessment of environmental performance of buildings — Calculation method); and The RICS Professional Statement: Whole Life Carbon assessment for the building environment (which implemented BS principles).

Analyse and Interpret Results

Identify carbon hotspots and explore opportunities for reduction, such as material substitutions or energy-efficiency measures.

Report Findings

Present the results in a clear and actionable format, highlighting key insights and recommendations.

A WLC assessment should be submitted at the following stages:

- Pre-application (where relevant)
- Planning application submission (i.e. RIBA stage 2/3)
- Post-construction (i.e. prior to occupation of the development.

Generally, it would be expected that the assessment would be received three months post-construction

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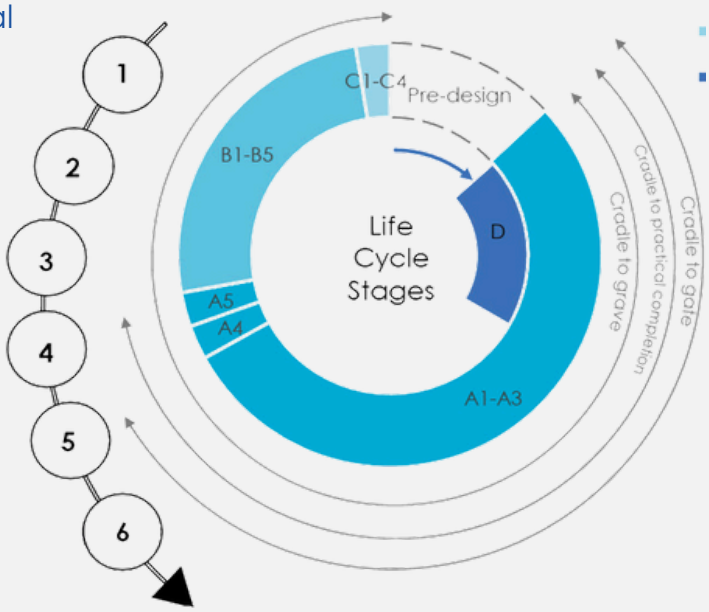
Strategies for reducing Whole Life Carbon

1. Build less

- Challenge the client brief for spatial efficiency
- Re-use and renovate existing instead of new build, where possible
- Carry out audit of materials on site for Circular Economy purposes

2. Build light

- Review structural loadings, utilisation and spans
- Reduce material quantities before relying on specification
- Consider whole life aspects - replacements and maintenance



Leti Embodied carbon strategies for Reducing WLC

3. Build wise

- Know where your carbon is: including 'big ticket' items and repeating 'small ticket' items
- Explore standard modules, test Design for Manufacture and Assemble (DfMA) options and material efficiency

4. Build low carbon

- Specify low-carbon, renewable, bio based, re-used or recycled materials from responsible sources
- Be aware of uncertainty/variability in data

5. Build for the future

- Design for durability, flexibility and adaptability
- Design for disassembly and circular economy at end of life

6. Build collaboratively

- Measurement, verification and disclosure
- Share knowledge

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Whole Life Carbon benchmarks

Below are the GLA benchmarks for a typical office building.

The information provides a guide for WLC assessors and design teams regarding where we would 'typically' expect a building of a particular typology to fall within for each of the modules.

The breakdown also indicates how we would anticipate carbon to be broken down within each of the modules.

Modules	WLC benchmark (kgCO2e/m2 GIA)	Aspirational WLC benchmark (kgCO2e/m2 GIA)	Breakdown of a typical development
A1-A5 (excluding sequestration)	<950	<600	Substructure: 19 per cent Superstructure: 36 per cent Façade: 17 per cent Internal finishes: 10 per cent FFE: 2 per cent Services/MEP: 14 per cent External works: 2 per cent
B-C (excluding B6 & B7)	<450	<370	Substructure: 1 per cent Superstructure: 4 per cent Façade: 21 per cent Internal finishes: 27 per cent FFE: 9 per cent Services/MEP: 35 per cent External works: 3 per cent
A-C (excluding B6 & B7, including sequestration)	<1400	<970	Substructure: 13 per cent Superstructure: 25 per cent Façade: 18 per cent Internal finishes: 16 per cent FFE: 5 per cent Services/MEP: 21 per cent External works: 2 per cent

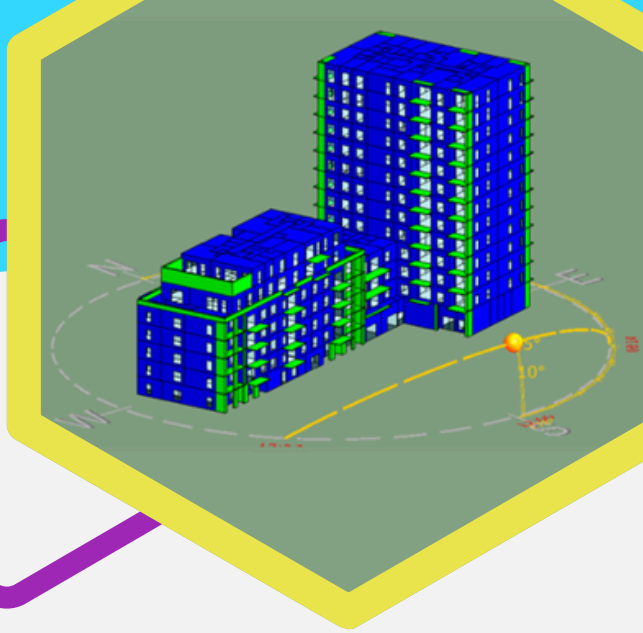
Benchmark targets are offered for: Offices, Residential, Schools & Universities, Retail.

Other organisations who have also outlined their own targets include **RIBA 2030 Climate Challenge and LETI.**

Challenges with Whole Life Carbon

- **Inconsistencies in reporting against the Methodology**
- **Varying targets** - Each organisation that has established targets derives its data from various sources, such as actual data collected from projects or aspirational goals aligned with broader climate objectives. Whilst the targets exist and should be adhered to, it does not guarantee that every target will be achieved.
- **Availability of information**
- **Integration with business decision-making** - Where results are not directly linked to a financial benefit, it can be challenging to integrate measures into the design
- **Defining the boundaries of the assessment -** e.g. when to start and end the assessment period, and what aspects of the building to include or exclude can be challenging.

Case Sudy



Mass Density Residential Project

The project includes two buildings comprising flexible Use Class E and F2 floorspace and 125 Use Class C3 residential apartments, landscaping, parking facilities, cycle parking facilities, servicing, access and associated public realm improvements.

Futura Bright were appointed to undertake post planning modelling on the development to understand the changes from planning stage, throughout the design phase. We have also been appointed to monitor progress throughout Stages 5 and 6 and report the final model for Post Construction.

Due to the availability of a Revit model on the scheme, this information informed the modelling on the specific material inputs and quantities which had been specified by the design team in the initial early stages.

The model was uploaded to the OneClick LCA platform to determine the overall carbon inputs currently being worked with. Where information wasn't included, the WLC team relied on guidance from the RICS Professional Statement, as well as engaged with the team on likely scenarios and options to specify for the interim.

One Click LCA

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Targets specified by the GLA			Actual Modelling Results at RIBA Stage 3 (kgCo2e/m2 GIA)
	Baseline Benchmark (kgCo2e/m2 GIA)	Aspirational Benchmark (kgCo2e/m2 GIA)	
A1-A5 (excl. sequestration)	<850	<500	~1,048
B-C (excl. B6 & B7)	<350	<300	~154
A-C (excluding B6 & B7, including sequestration)	<1200	<800	~1,482

The results determined:

- The project has not yet fully met the baseline and aspirational benchmarks targets for A1-A5, presenting opportunities for the design team to improve outcomes through enhanced clarity and collaboration on product specifications. Considerations such as material selection, choice of manufacturer will inform the results and help drive performance improvements as the project continues.

- For Module B, the modelling has successfully exceeded both benchmark targets, indicating that the chosen products will require minimal maintenance and result in lower emissions – demonstrating a significant sustainable achievement.

- Overall, the projects performance does not meet the benchmark and / or aspirational targets set for a building of this typology. Being in the early stages of the project programme, these results inform the team on areas to focus on moving forward, with an understanding results will change throughout all modules as we progress throughout the programme. The flexibility is viewed positively in order to support ongoing improvement and innovation throughout the scheme.

Case Sudy

Challenges

- Availability of information – Early-stage information is always in flux and subject to change. The results determined at this stage provide the team with an understanding as to where to concentrate their efforts in terms of reducing carbon e.g., exploring alternative material types, manufacturers, quantity of materials being specified regarding the A1-A5 module for example. Additionally, assumptions would have also been made based on industry default data which will not be providing an 'accurate' representation of the model – just a likely scenario.

- Integration with business decision making – As mentioned previously, where results are not directly linked to a financial benefit, just reporting for compliance it can be challenging to integrate measures into the design moving forward.

Priorities were to look at how the building could be cleverly designed with the use of carbon materials, streamlined delivery processes and minimised overall resource consumption before the transition into construction phase.

The construction phase prioritised efficient building, embracing new construction technologies and looking to eliminate waste as far as possible.

How we can help

Regulatory compliance, and more

LCA The RICS Guidance (IS0 14040 Life Cycle Assessment) is a standardised, science-based tool methodology for quantifying the lifetime environmental impact of development schemes. in order to assess lifetime environmental impact.

Transforming the built environment requires collaboration and expertise. Our team specialises in Whole Life Carbon Assessments, helping architects and developers create buildings that are both sustainable and compliant with emerging regulations.

Futura Bright use One Click LCA (which has the GLA seal of approval) to help you meet local and regional requirements and can compile compliant Whole Life Carbon and Circular Economy Statements in support of your development scheme. your requirements.

With One Click LCA we can support you through all stages of the submission from pre-application stage to post-construction making the shift to a whole carbon approach easier.

Using this platform helps us to perform a life cycle assessment of the whole building in a very short time and identify the hotspots in which you need to take action, helping you demonstrate your credentials to the relevant Authorities..

Ready to decarbonise your designs? Contact us for a free consultation or a tailored demonstration of our services.

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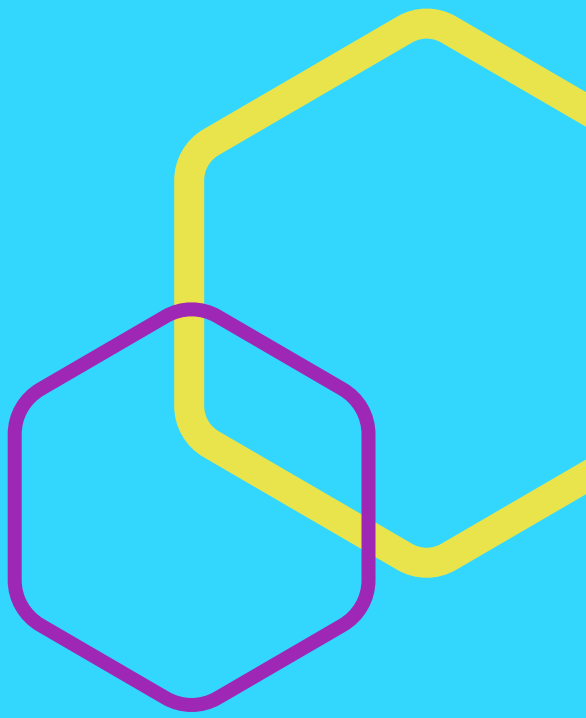

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