

Embodied Carbon Target Alignment

Introduction

This document has been produced to provide alignment in Embodied Carbon measurement and comparisons. The industry needs to standardise performance and reporting scopes to meet IPCC recommendations for urgent emissions reductions. LETI have worked with RIBA, the GLA, IStructE and the UKGBC to produce this document.

A key issue the industry faces is the lack of consistent measurement, leading to mis-aligned benchmarks, project targets and claims.

Alignment in methodology is considered the interim step towards developing net zero carbon targets that reflect the UK's carbon budget. Targets will only be useful once measurement is consistent. The UKGBC's 2021 Whole Life Carbon Net Zero Roadmap project will generate sectoral carbon budget estimates, which will assist in future more detailed building-level target setting.

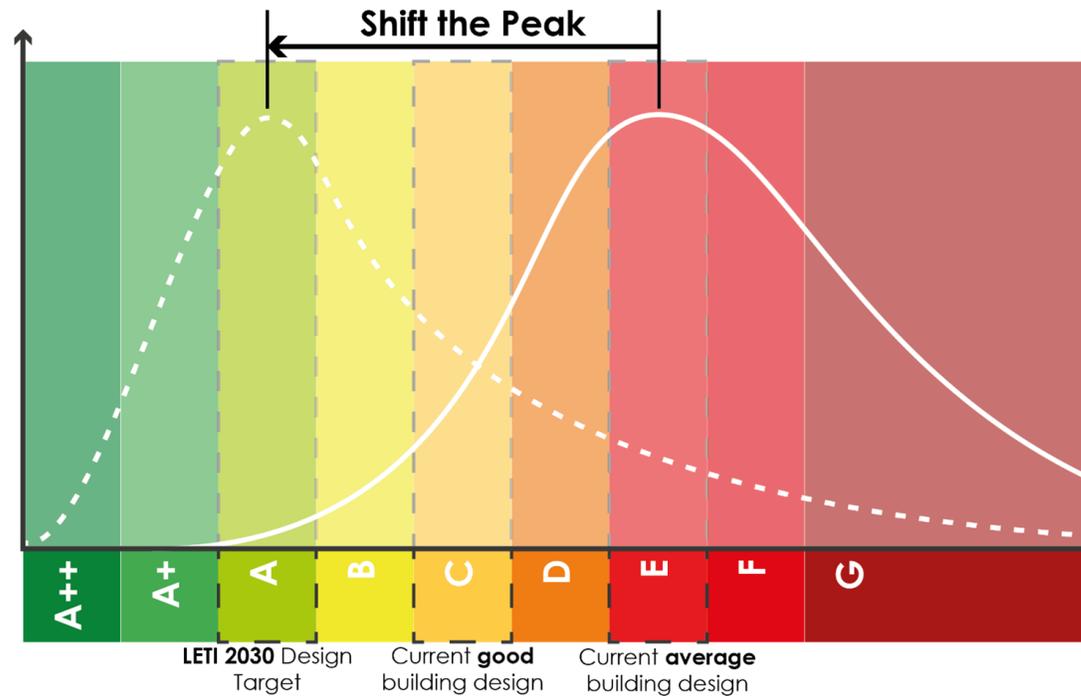
This paper summarises the following key points:

- The industry must push for Embodied Carbon reporting on all projects.
- A rating system should be introduced to allow quick comparison of ambition across various typologies and portfolios
- Total embodied carbon targets have been introduced
- Targets for retail have been developed
- LETI and RIBA now have consistent embodied carbon target
- Data disclosure and breakdowns are key to ensuring reporting is valid and comparable.
- There are two scopes that should be reported against: Upfront Carbon (modules A1-5, excluding sequestration), and total Embodied Carbon (A1-5, B1-5, C1-4, including sequestration).

The Case for Letter Bandings

It is suggested that a rating system that allows comparison of embodied carbon ambition across typologies and facilitation of conversations about embodied carbon with key decision makers. Using a letter rating system, which is already familiar in the context of Display Energy Certificates will allow industry professionals to talk about an "A rated" building and know that they are talking about the same level of ambition regardless of the project. A rating system can support competition across various levels of ambition, something which is particularly useful in portfolio reporting (either for building owners or in schemes like the RIBA practice survey).

Current best-practice performance is considered to be a C rating, while a B and above is considered a robust stretch target. Though only 4 typology rating bands are provided currently, the methodology can be repeated for other typologies or scopes of work as more data becomes available. The bandings do not currently differentiate between new build or refurbishment. Part of the rationale for this is that refurbishment projects will find it easier to achieve good performances and this provides an incentive for retrofit. It is expected that as more data is collected for ranges of retrofit, the bandings could be adapted if necessary.



Using the ratings

The LETI position is that for buildings that are currently in the design stage:

- Average design achieves an E
- Good design achieves a C (LETI 2020 target)
- LETI 2030 design target achieves an A

The RIBA 2030 Climate Challenge built performance is equivalent of a B rating (note that this assumes practical completion in 2030, so designed earlier).

Signposting

This document is designed to be read with other LETI documents including the:

- LETI Embodied Carbon Primer
- Whole Life Carbon and Embodied Carbon One Pagers
- Net Zero Carbon Definitions
- Reporting templates on the LETI website
- FAQs available on the LETI website

Project Name: Test Project Project Sector: Office Assessment Date: 16/02/2022 Assessment By (company): LETI Location of Data: leti.london	Upfront Embodied Carbon A1-5 exc. sequestration (kgCO ₂ e/m ²)	Life Cycle Embodied Carbon A1-5, B1-5, C1-4 (kgCO ₂ e/m ²)
A++	100	150
A+	225	345
A	350	530
B	475	750
C	600	970
D	775	1180
E	950	1400
F	1100	1625
G		
Non-Listed Typology:		
Sequestered Carbon:	-86 kgCO ₂ e/m ²	
Module D:		110 kgCO ₂ e/m ²

Proposed rating 'badge'

Graphic showing the range of performance based on benchmarked projects, and the need to improve the average

Embodied Carbon Target Alignment

Determining the Letter Bandings

In the preparation of the letter bandings, a number of data sources have been analysed. The starting point was data from Cundall and Targeting Zero. The results have been cross referenced with data provided by other companies, including Efool, Price & Myers, Arup, Hilson Moran. Data that appeared to have significant omissions was not used.

There is currently large variation across Life Cycle Analysis inputs and therefore reported final figures. The product LCA data used can differ significantly depending on the source and whether it is generic, or fully representative of the product or material. This is compounded by individual project assumptions. As data sets and guidelines, such as CIBSE TM 65, mature this situation will improve. In the meantime however, it is considered that the ratings proposed in this paper are of the right order of magnitude to enable designers to determine whether a particular project is significantly better or worse than 'business as usual'.

Data Reporting

To enable direct comparisons both between projects and benchmarks, consistency of assessment method and reporting is necessary, to enable peer-review and simplify future analysis of projects.

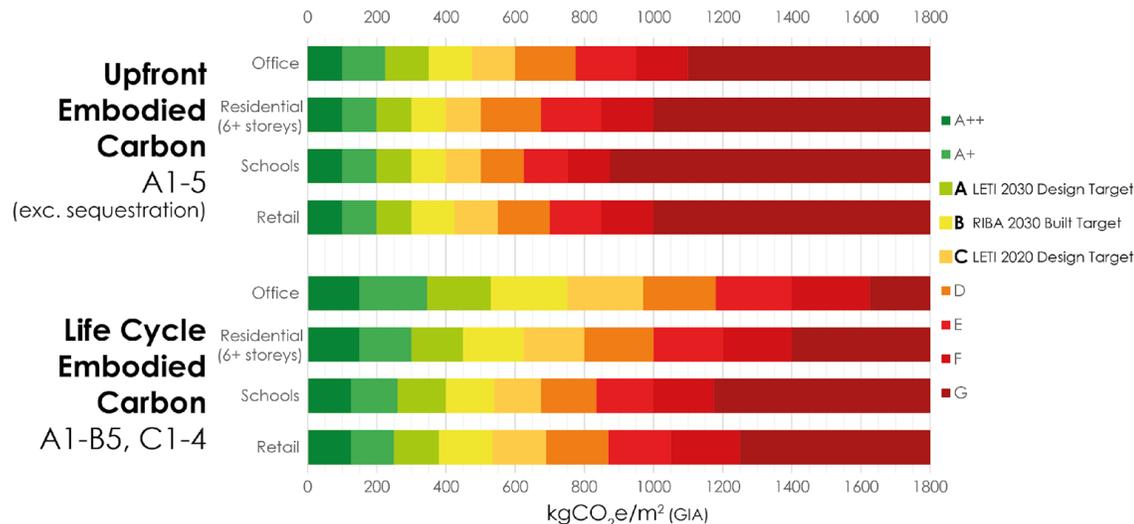
When calculating embodied carbon, the RICS Professional Statement should be followed and a minimum of 95% of cost should be included in the assessment. The scope must include substructure, superstructure, finishes, fixed FF&E, building services and associated refrigerant leakage, but excluding external works outside the building footprint. When reporting the total embodied carbon figure, the calculations should be broken down as per the reporting template, which is provided on the LETI website. It allows the breakdown per building element to be reported, along with material quantities, data sources and boundary of the project. It should be noted that the commercial assessments cover Cat A, and Cat B fit outs are reported separately.

It is anticipated that projects will report at key stages, including planning, tender, and as-built, with the data accuracy increasing as the design becomes increasingly fixed/detailed. It is recommended that generic or typical carbon factors are used for materials at the early design stages to focus on the efficiency of material use. Once particular products have been specified, calculations shall be updated using product-specific EPDs. materials at the early design stages to focus on the efficiency of material use. Once particular products have been specified, calculations shall be updated using product-specific EPDs.

For clarity, sequestration is reported separately if reporting only Upfront Carbon (modules A1-5) but shall be included if reporting end-of-life emissions for Life Cycle Embodied Carbon (A1-5, B1-5, C1-4). Module D should be reported separately. Offsetting is not included. This ensures that direct emissions can be clearly identified in parallel to recording the beneficial aspects of the design.

Embodied carbon figures should be provided for Upfront Carbon (modules A1-5), and Life Cycle Embodied Carbon (A1-5, B1-5, C1-4), enabling the separation of construction impacts from future ongoing impacts.

In order to claim a rating against the bandings, the template for a particular project should be fully completed and publicly disclosed on a website.



Graphic showing the embodied carbon letter bandings for four typologies

		Embodied Carbon per Module per Element (kgCO ₂ e/m ² , GIA)							
		A1-5	A1-5 (excl. sequestration)	A4	A5	B1-5	B4&5	C1-4	D
Demolition	Tenement Treatment								
	Major Demolition Works								
Facilitating Works	Temporary/Existing Works								
	Specialist Groundworks								
Substructure	Substructure	250	-50	60	50	50	100	50	25
Superstructure	Frame								
	Upper Floor								
	Floor								
	Stair and Ramp								
	External Wall								
	Window and External Door								
Finishes	Internal Wall and Partition								
	Internal Door								
	Wall Finish								
	Floor Finish								
FF&E	Curtain Finish								
	FF&E (Fixed)								
Building Services	FF&E (non-Fixed)								
	Building Services								
Prefabricated Buildings	Refrigerant Leakage								
	Renewable Electricity Generation								
Work to Existing Buildings	Prefab Building Utility								
	Minor Demolition and Alteration								
External Works	External Works								
	TOTAL	250	-50	60	50	50	100	50	25

Thumbnail of full reporting template

Reporting template available here: <https://www.leti.london/carbonalignment>

1. Data quality footnote: Datasources, used to determine the letter bandings were assessed using EPDs data and project specific material quantities and specifications. Where the specification is not available, assumptions were made following the RICS professional statement. Full scope of assessment based on RICS PS were followed and internal finishes included CAT-A level finishes only (P&M and Arup data only included building structural data). A minimum of 95 per cent of the cost allocated to each building element category were accounted for in the assessment. All life-cycle modules apart from B6, B7 (operational energy and operational water). Note that the residential dataset available comprised of multi-residential, 6 storeys and above.

2. Structures: Note that the IStructE have published their own embodied carbon rating scheme ('SCORS', [reference](#)), which is applied to the combined superstructure and substructure, for upfront emissions. Whilst the IStructE haven't set specific targets, the SCORS system should be referred to if setting targets for the structural components of a project. Benchmarking data suggests that typical structures contribute to 50-60% of the total upfront carbon of a project (refer to LETI Embodied Carbon Primer for further guidance). As such, a LETI target A rating typically aligns with a SCORS B rating for Office, Residential and Educational typologies, and SCORS C rating for retail (due to the car parking).

Embodied Carbon Target Alignment

Which target do I use?

Current best-practice performance for projects in the design phase is considered to be a "C" rating, while a "B" and above is considered a robust stretch target.

Relationship to the previously published LETI targets

In January 2020, LETI published the Climate Emergency Design Guide and the Embodied Carbon Primer. This guidance set out upfront carbon targets (modules A1-A5), for residential, office and schools using a limited data set.

These documents put forward how the industry could define 'good' for embodied carbon for buildings that are designed in 2020 and in 2030. Since then, these targets have been used in design projects and referred to as LETI 2020 target and LETI 2030 target.

Letter banding targets have since been developed, the table below shows how the existing LETI targets align with the letter banding.

Building Target	Equivalent letter banding
LETI Design 2020 Target	C
LETI Design 2030 Target	A
RIBA Built 2030 Target	B

How this relates to the RIBA 2030 challenge

The initial (2019) version of the RIBA 2030 Challenge set out total embodied carbon (A1-A5, B1-B5, C1-C4) performance targets, rather than the upfront carbon targets published by LETI.

The figures were not directly comparable as they had these different scopes. With the release of the second (2021) version of the RIBA 2030 Challenge in June '21 the LETI and RIBA embodied carbon figures will be aligned. However, please note that RIBA targets are performance targets to be realised in buildings completed in 2025 and 2030, whereas LETI dates relate to the year of design.

Embodied carbon benchmarks and targets are a developing knowledge area; it is anticipated that as the quantity of more accurate and detailed information becomes available target figures may be updated. It may also become relevant to refine and provide an increased number of typology specific targets.

How should embodied carbon be analysed?

The targets are to be assessed including the elements required in RICS Professional Statement Whole Life Carbon Assessment for the built environment Table 3, excluding non-fixed FF&E, external works outside the building footprint, and renewable electricity generation (e.g. PVs). These have been omitted to focus the design on the building itself, and ensure comparability between ratings. Space is provided to record these additional elements within the reporting template, but entering them does not affect the overall rating.

Analysis should be undertaken following the RICS Professional Statement methodology, using the default values where not yet known.

Notes regarding the typologies

The residential bandings are based on a dataset for multi-residential of 6 storeys and above. The education bandings are based on a dataset of schools.

Upfront Embodied Carbon, A1-5 (exc. sequestration)

Band	Office	Residential (6+ storeys)	Education	Retail
A++	<100	<100	<100	<100
A+	<225	<200	<200	<200
A	<350	<300	<300	<300
B	<475	<400	<400	<425
C	<600	<500	<500	<550
D	<775	<675	<625	<700
E	<950	<850	<750	<850
F	<1100	<1000	<875	<1000
G	<1300	<1200	<1100	<1200

LETI 2030 Design Target

LETI 2020 Design Target

Life Cycle Embodied Carbon, A1-5, B1-5, C1-4

Band	Office	Residential (6+ storeys)	Education	Retail
A++	<150	<150	<125	<125
A+	<345	<300	<260	<250
A	<530	<450	<400	<380
B	<750	<625	<540	<535
C	<970	<800	<675	<690
D	<1180	<1000	<835	<870
E	<1400	<1200	<1000	<1050
F	<1625	<1400	<1175	<1250
G	<1900	<1600	<1350	<1450

RIBA 2030 Build Target