

RIBA 2030

Climate Challenge

Version 2 (2021)

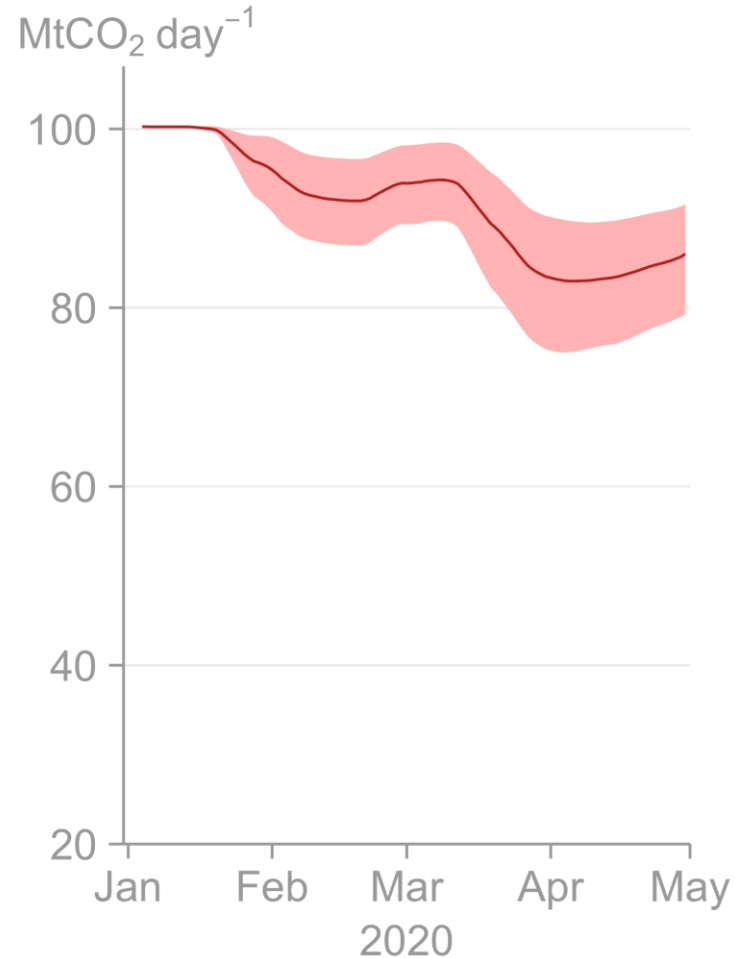
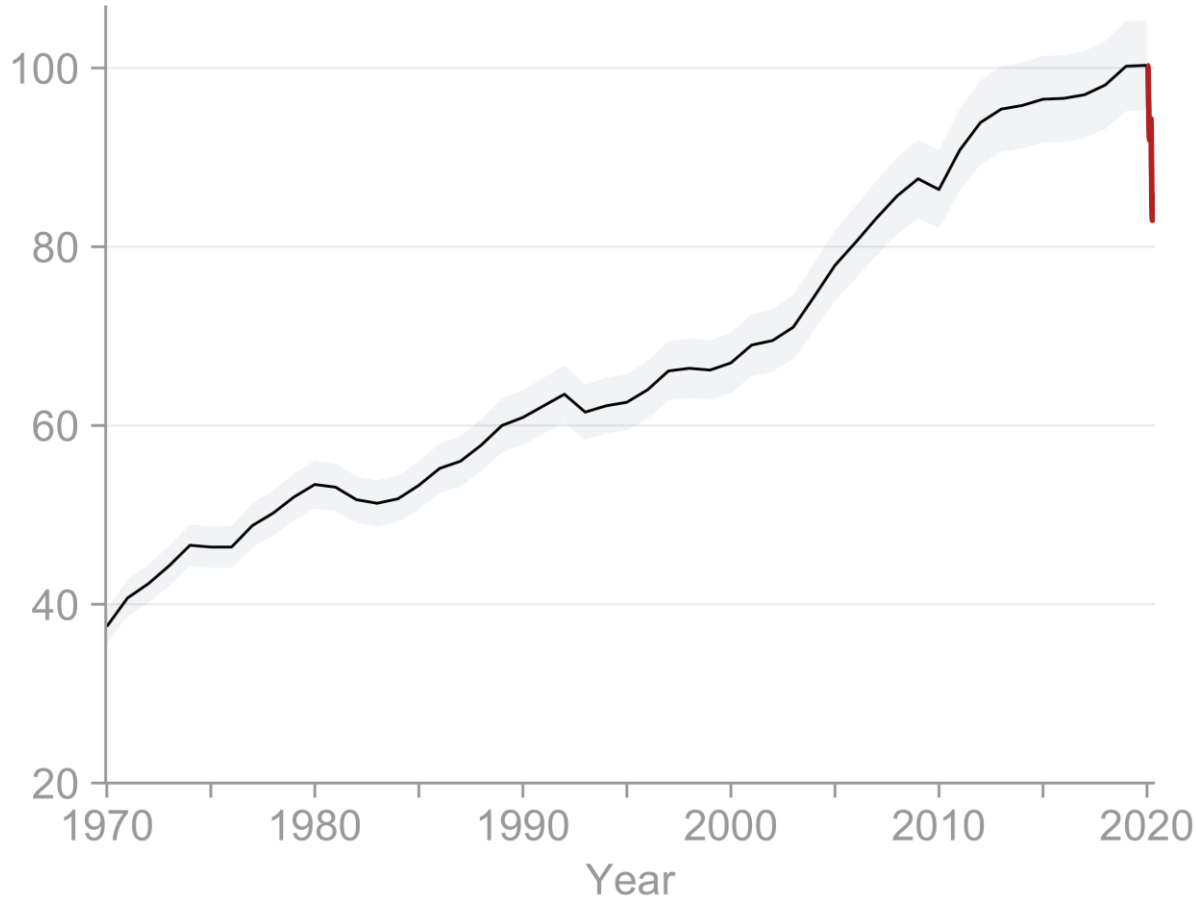


www.architecture.com/2030challenge

RIBA 
Architecture.com

Global CO₂ Emissions

Global daily fossil CO₂ emissions
MtCO₂ day⁻¹



1/4 from use
of buildings

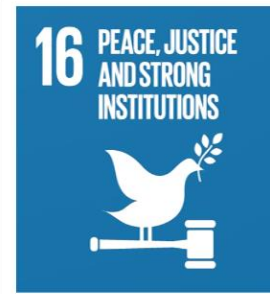
1/10 from
construction

RIBA Climate Change Resolution

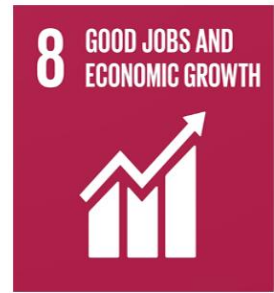
RIBA joined the declaration of an environment and climate emergency and confirmed support for the UK government's commitment to put into legislation the UKCCC recommendation for a UK 2050 net zero greenhouse gas emissions target.

June 2019

UN Sustainable Development Goals



UN Sustainable Development Goals – Buildings



RIBA Sustainable Outcomes



Good Health and Well-being



Sustainable Water Cycle



Net Zero Operational Carbon Emissions



Sustainable Life Cycle Cost



Sustainable Connectivity and Transport



Sustainable Communities and Social Value



Net Zero Embodied Carbon Emissions



Whole Life Carbon Emissions



Sustainable Land-use and ecology



RIBA Sustainable Outcomes Metrics

1 Net Zero Operational Energy/Carbon - kWh/m²/y, kgCO₂e/m²/y
CIBSE TM54, Passivhaus, Living Building Challenge

2 Net Zero Embodied Carbon - kgCO₂e/m²
RICS Whole Life Carbon, BREEAM, Living Building Challenge

3 Sustainable Water Cycle - litres/person/day
Living Building Challenge, BREEAM Water

4 Sustainable Connectivity and Local Transport - kgCO₂e/km/p/y
BREEAM Transport

5 Sustainable Land-use and Ecology - various metrics
Living Building Challenge, BREEAM Bio-diversity

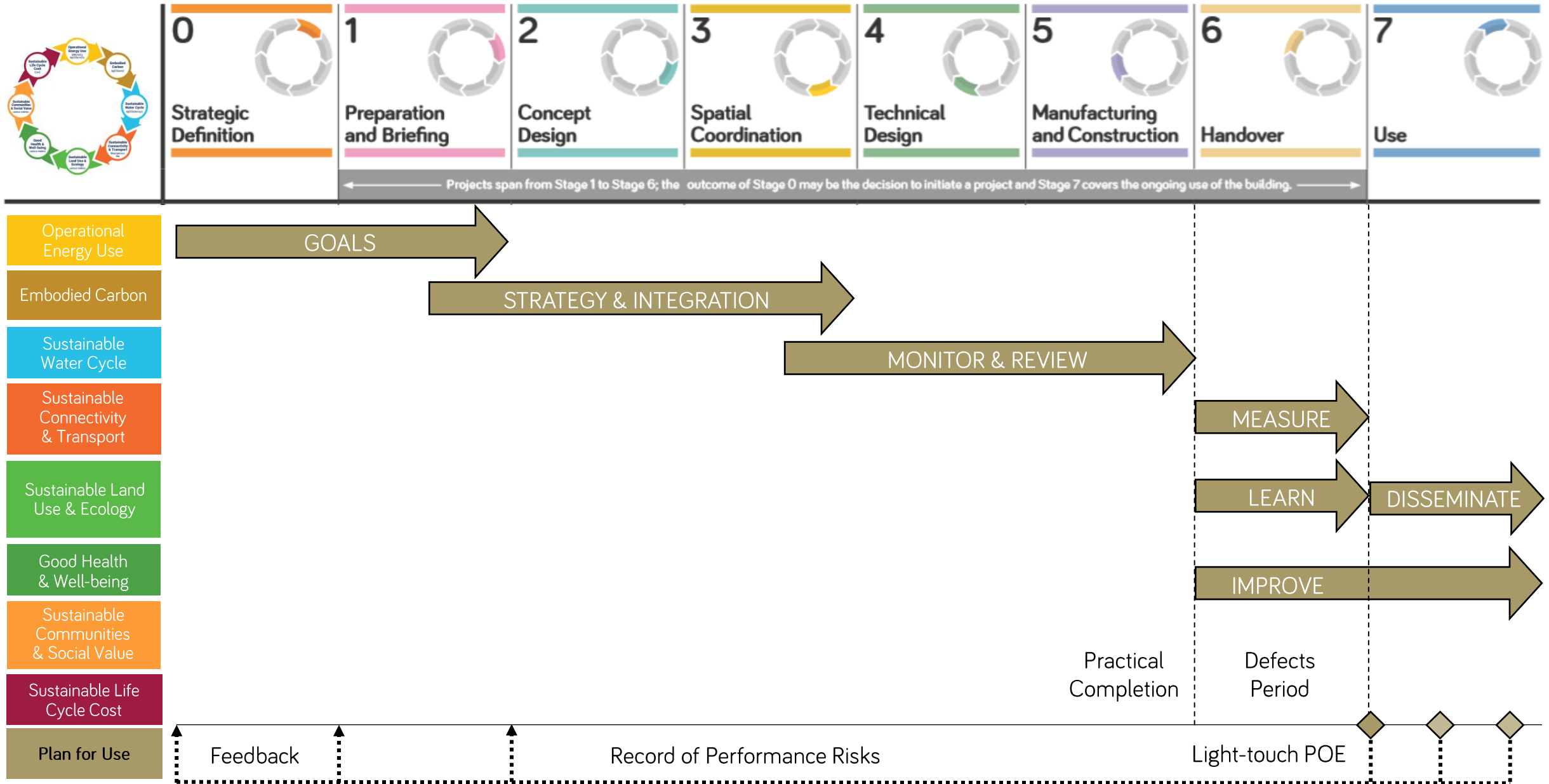
6 Good Health & Wellbeing - various metrics
BREEAM, Well building Standard- light, air, water, noise, overheating

7 Sustainable Communities and Social Value - various metrics
Living building Standard, BREEAM, Well building Standard, RIBA Social Value Toolkit

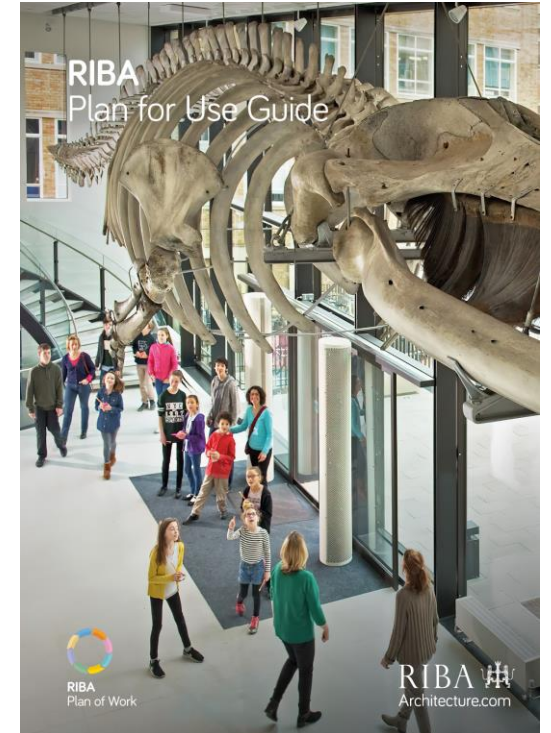
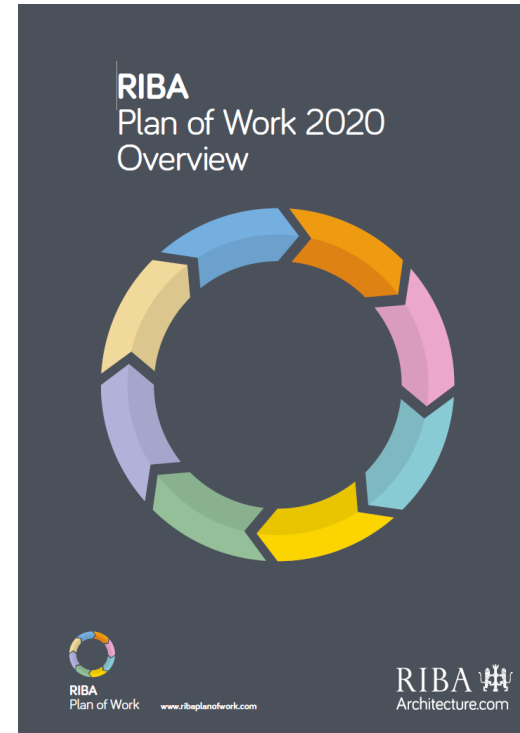
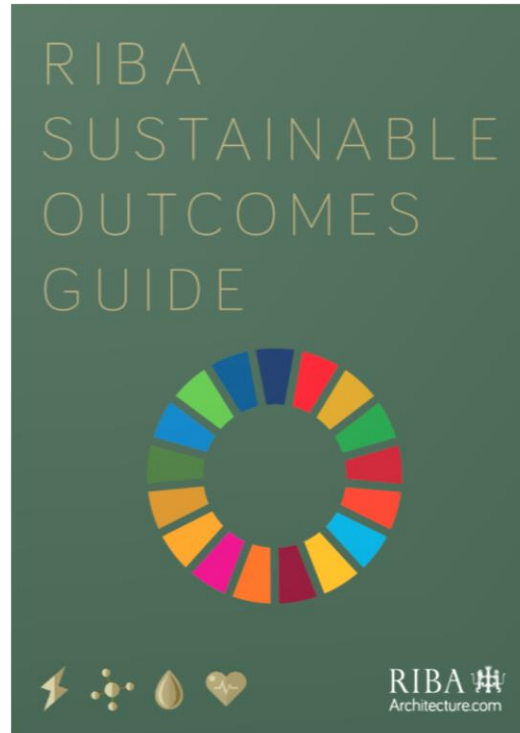
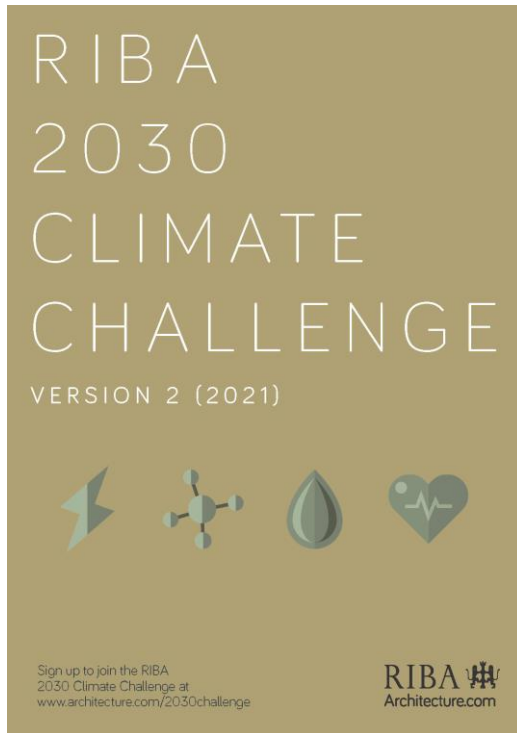
8 Sustainable Life Cycle Cost - £/m²
ICMS Whole Life Cost



RIBA Sustainable Outcomes – Plan of Work 2020



RIBA Sustainable Outcomes – Suite of Guidance



Target Setting

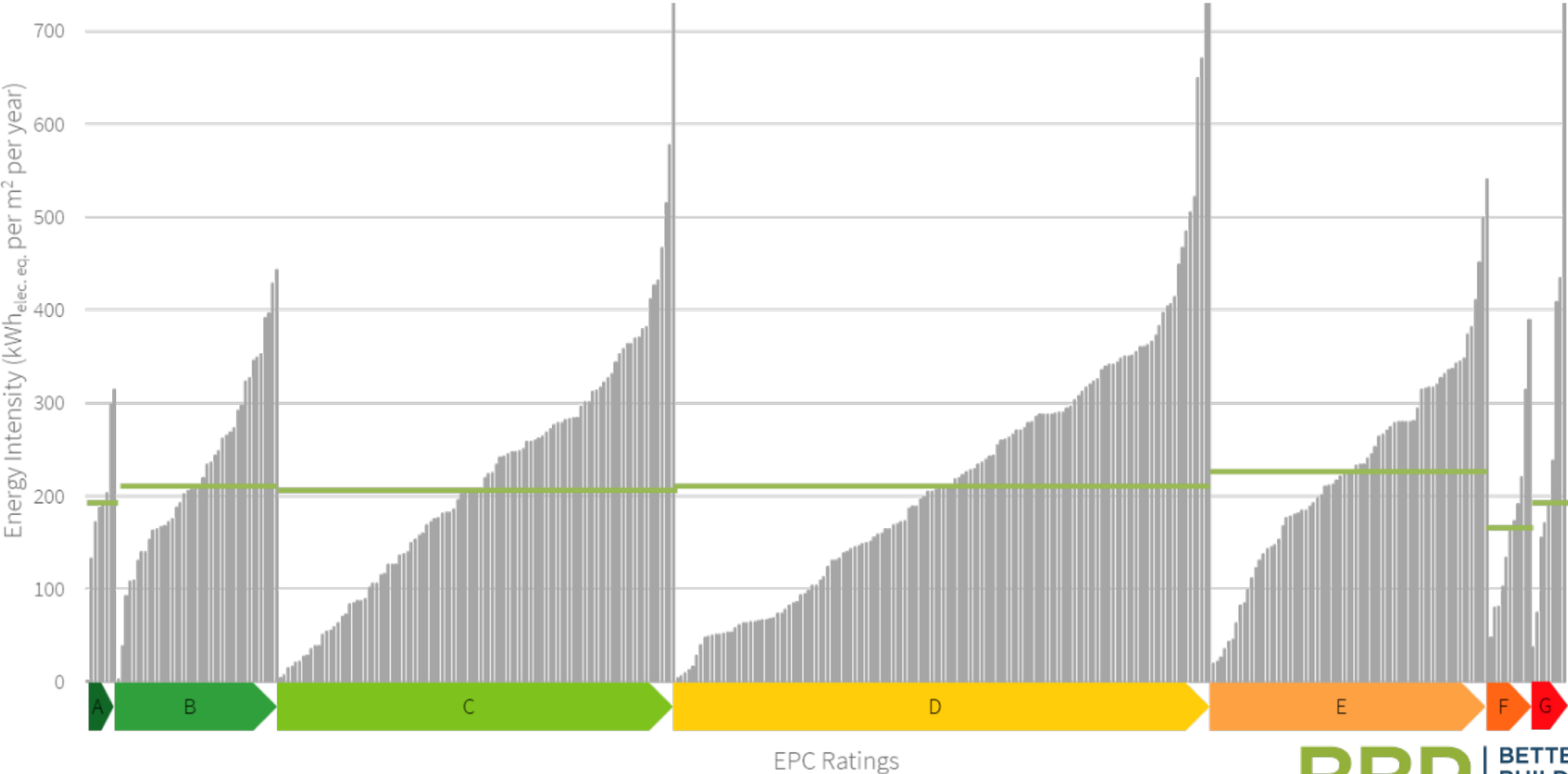
Operational Energy – kWh/m²/y

Embodied Carbon – kgCO₂e/m²

Water Use – litres/person/day

Health and Wellbeing – various

A Dysfunctional Regulatory System

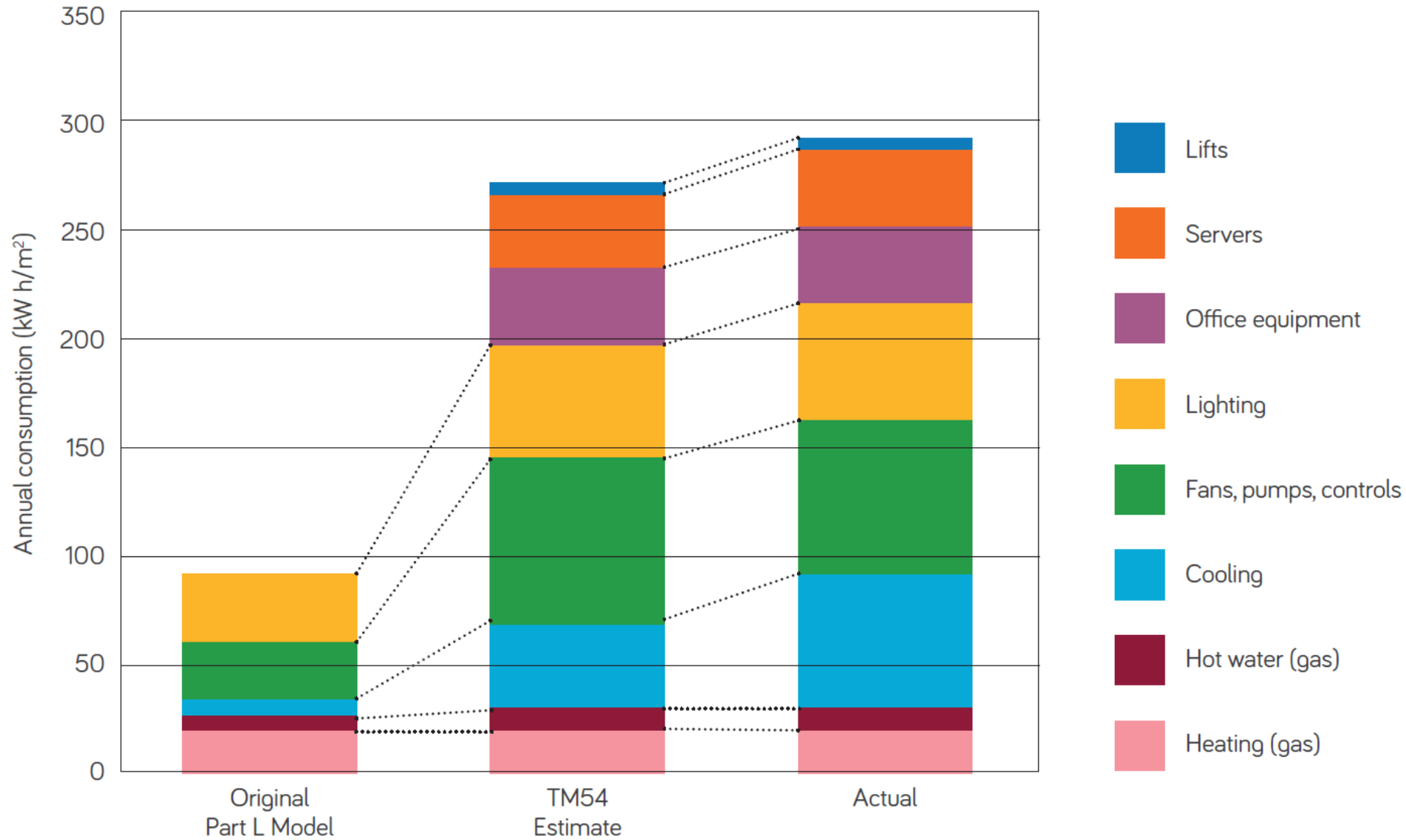


EPC Ratings

BBP | BETTER BUILDINGS PARTNERSHIP

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More Accurate Energy Modelling



LETI/RIBA/WLCN Carbon Alignment

Information

Embodied Carbon

Definition
Embodied carbon is the CO₂ emissions from the production of building materials and components, from the extraction of raw materials to the construction of the building, and from the production of the building materials and components.

Life cycle embodied carbon emissions
The sum of embodied carbon emissions from the construction of the building and the embodied carbon emissions from the building materials and components over the building's life cycle.

Key
 • **Pre-design**
 • **Design**
 • **Construction**
 • **Operational**
 • **End of life**

Hierarchy for Embodied Carbon Reduction

1. **Build less**
Minimize embodied carbon by reducing the amount of building materials and components used.
2. **Build light**
Minimize embodied carbon by using lighter building materials and components.
3. **Build smart**
Minimize embodied carbon by using more efficient building materials and components.
4. **Build low carbon**
Minimize embodied carbon by using low-carbon building materials and components.
5. **Build for the future**
Minimize embodied carbon by using building materials and components that are durable and can be recycled.

Whole Life Carbon

Definition
Whole life carbon is the sum of embodied carbon emissions and operational carbon emissions over the building's life cycle.

Embodied Carbon
Embodied carbon is the CO₂ emissions from the production of building materials and components, from the extraction of raw materials to the construction of the building, and from the production of the building materials and components.

Operational Carbon
Operational carbon is the CO₂ emissions from the operation of a building over its life cycle.

Module D
Module D is the embodied carbon emissions from the construction of the building and the embodied carbon emissions from the building materials and components over the building's life cycle.

Guidance
 1. **Reduce embodied carbon**
 2. **Use low-carbon materials**
 3. **Use recycled materials**
 4. **Use local materials**
 5. **Use durable materials**
 6. **Use materials that can be recycled**

Targets

Industry Embodied Carbon Target Alignment

Introduction
This document has been produced to provide alignment on embodied carbon measurement and reporting. The industry needs to develop a common approach to embodied carbon measurement and reporting to ensure consistency across the sector.

The Case for Life Cycle Reporting
A key objective of the reporting process is to provide a clear picture of the embodied carbon footprint of a building project. This is essential for understanding the carbon footprint of a building project and for identifying opportunities to reduce embodied carbon.

Using the ratings
The LETI ratings are designed to provide a clear picture of the embodied carbon footprint of a building project. The ratings are based on the embodied carbon footprint of the building project and are expressed in terms of CO₂ emissions per square meter.

Supporting
 • **LEI**
 • **LEI**
 • **LEI**
 • **LEI**
 • **LEI**

Industry Embodied Carbon Target Alignment

Determining the target
The target for embodied carbon is determined by the building's location, the building's use, and the building's design. The target is expressed in terms of CO₂ emissions per square meter.

Reporting
 • **Reporting**
 • **Reporting**
 • **Reporting**
 • **Reporting**
 • **Reporting**

Comments: showing the proposed embodied carbon life cycle targets for key typologies

Definitions

LETI **RIBA** **WLCN**
Architecture.com
Version: 11.05.2021

3. Achieving Net Zero Carbon

Project Stage	Whole Life Carbon				WLCN/LEI
	Upfront Carbon (A1-A5)	In-use Embodied Carbon (B1-B5)	On-site Operational Carbon (C1-C4)	End of Life (C1-C4)	
Concept Design	Production based on generic values	Production based on generic values	Production based on generic values	Production based on generic values	Production based on generic values
Detailed Design	Production based on specific values	Production based on specific values	Production based on specific values	Production based on specific values	Production based on specific values
Practical Completion	Production based on actual values	Production based on actual values	Production based on actual values	Production based on actual values	Production based on actual values
Use Stage	Production based on actual values	Production based on actual values	Production based on actual values	Production based on actual values	Production based on actual values
End of Life	Production based on actual values	Production based on actual values	Production based on actual values	Production based on actual values	Production based on actual values
Future Projects to address Net Zero	Production based on actual values	Production based on actual values	Production based on actual values	Production based on actual values	Production based on actual values

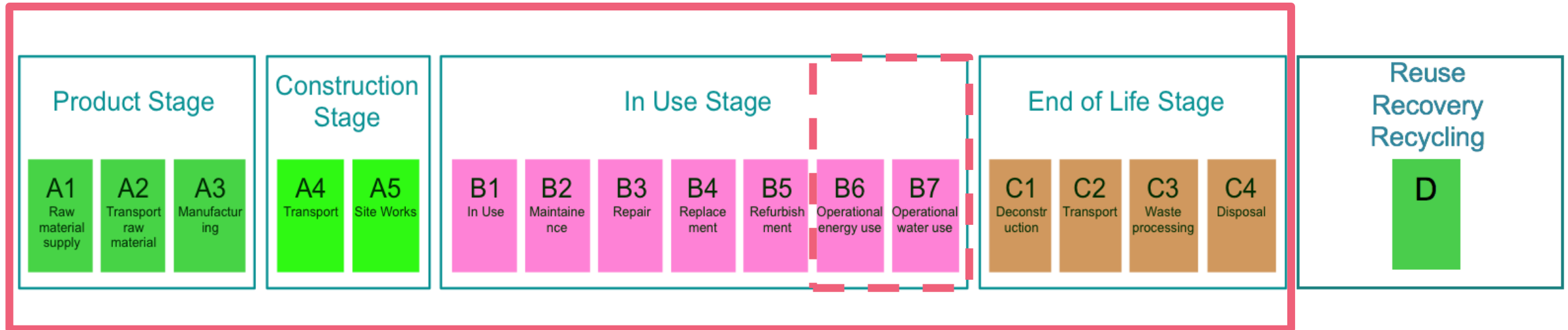
Key:
 • **Net Zero Carbon in design**
 • **Net Zero Carbon enabled**
 • **Net Zero Carbon**

This table sets out how to achieve net zero carbon at each project stage. It also illustrates the requirements across project life cycle modules through to Module D and the relationship to achieving net zero through residual carbon offsets.

For example:
 - At the design stage the asset can be predicted to be net zero, based on generic values.
 - At Practical Completion an asset can be net zero upfront carbon, subject to verification and residual offsets.
 - At Practical Completion, an asset is also potentially net zero carbon enabled to allow the occupier to have a net zero occupation subject to actual performance and residual associated offsets.




Comments: simon.sturge@rangingzero.co.uk

Lifecycle phases






Embodied Carbon
(operational reported separately)




Non-Domestic – Offices Targets

RIBA Sustainable Outcome Metrics	Business as Usual	2025 Targets	2030 Targets	Notes
Operational Energy kWh/m ² /y 	130 kWh/m ² /y DEC D (90)	< 75 kWh/m ² /y DEC B (50) and/or NABERS Base build 5	< 55 kWh/m ² /y DEC B (40) and/or NABERS Base build 6	Targets based on GIA. Figures include regulated & unregulated energy consumption irrespective of source (grid/renewables). 1. Use a 'Fabric First' approach 2. Minimise energy demand. Use efficient services and low carbon heat 3. Maximise onsite renewables
Embodied Carbon kgCO ₂ e/m ² 	1400 kgCO ₂ e/m ²	< 970 kgCO ₂ e/m ²	< 750 kgCO ₂ e/m ²	Use RICS Whole Life Carbon (modules A1-A5, B1-B5, C1-C4 incl sequestration). Analysis should include minimum of 95% of cost, include substructure, superstructure, finishes, fixed FF&E, building services and associated refrigerant leakage. 1. Whole Life Carbon Analysis 2. Use circular economy strategies 3. Minimise offsetting and use as last resort (accredited and verifiable) BAU aligned with LETI band E; 2025 target aligned with LETI band C and 2030 target aligned with LETI band B.
Potable Water Use Litres/person/day 	16 l/p/day (CIRA W1 benchmark)	< 13 l/p/day	< 10 l/p/day	CIBSE Guide G.

Non-Domestic – Schools Targets

RIBA Sustainable Outcome Metrics	Business as Usual	2025 Targets	2030 Targets	Notes
Operational Energy kWh/m ² /y 	145 kWh/m ² /y	< 70 kWh/m ² /y	< 60 kWh/m ² /y	<p>Targets based on GIA. Figures include regulated & unregulated energy consumption irrespective of source (grid/renewables).</p> <p>Refer to Department for Education Output Specifications for schools: 2025: Primary <55 kWh/m²/y, 2030: Primary <45 kWh/m²/y</p> <ol style="list-style-type: none"> 1. Use a 'Fabric First' approach 2. Minimise energy demand. Use efficient services and low carbon heat 3. Maximise onsite renewables
Embodied Carbon kgCO ₂ e/m ² 	1000 kgCO ₂ e/m ²	< 675kgCO ₂ e/m ²	< 540 kgCO ₂ e/m ²	<p>Use RICS Whole Life Carbon (modules A1-A5, B1-B5, C1-C4 incl sequestration). Analysis should include minimum of 95% of cost, include substructure, superstructure, finishes, fixed FF&E, building services and associated refrigerant leakage.</p> <ol style="list-style-type: none"> 1. Whole Life Carbon Analysis 2. Use circular economy strategies 3. Minimise offsetting and use as last resort (accredited and verifiable) <p>BAU aligned with LETI band E; 2025 target aligned with LETI band C and 2030 target aligned with LETI band B.</p>
Potable Water Use m ³ /pupil/year 	4.5 m ³ /pupil/y	< 1.5 m ³ /pupil/y	< 0.5 m ³ /pupil/y	Refer to Department for Education Output Specifications for schools.

Domestic/Residential Targets

RIBA Sustainable Outcome Metrics	Business as Usual	2025 Targets	2030 Targets	Notes
Operational Energy kWh/m ² /y 	120 kWh/m ² /y	< 60 kWh/m ² /y	< 35 kWh/m ² /y	Targets based on GIA. Figures include regulated & unregulated energy consumption irrespective of source (grid/renewables). BAU based on median all electric across housing typologies in CIBSE benchmarking tool. 1. Use a 'Fabric First' approach 2. Minimise energy demand. Use efficient services and low carbon heat 3. Maximise onsite renewables
Embodied Carbon kgCO ₂ e/m ² 	1200 kgCO ₂ e/m ²	< 800 kgCO ₂ e/m ²	< 625 kgCO ₂ e/m ²	Use RICS Whole Life Carbon (modules A1-A5, B1-B5, C1-C4 incl sequestration). Analysis should include minimum of 95% of cost, include substructure, superstructure, finishes, fixed FF&E, building services and associated refrigerant leakage. 1. Whole Life Carbon Analysis 2. Use circular economy strategies 3. Minimise offsetting and use as last resort (accredited and verifiable) BAU aligned with LETI band E; 2025 target aligned with LETI band C and 2030 target aligned with LETI band B.
Potable Water Use Litres/person/day  (Building Regulations England and Wales)	125 l/p/day	< 95 l/p/day	< 75 l/p/day	CIBSE Guide G.

Current Good Practice (2021)

For reference purposes, current (2021) Good Practice for new build projects in-use now, are as follows:

Non-Domestic (new build office):

Operational Energy 90 kWh/m²/y (GIA) and/or DEC C(65) and/or NABERS Base build 5;
Embodied Carbon LETI Band D 1180 kgCO₂e/ m²;
Potable Water Use 16 l/p/day


Non-Domestic (schools):

Operational Energy 75 kWh/m²/y (GIA);
Embodied Carbon LETI Band D 870 kgCO₂e/m²;
Potable Water Use 3m³/pupil/year

Domestic/Residential:

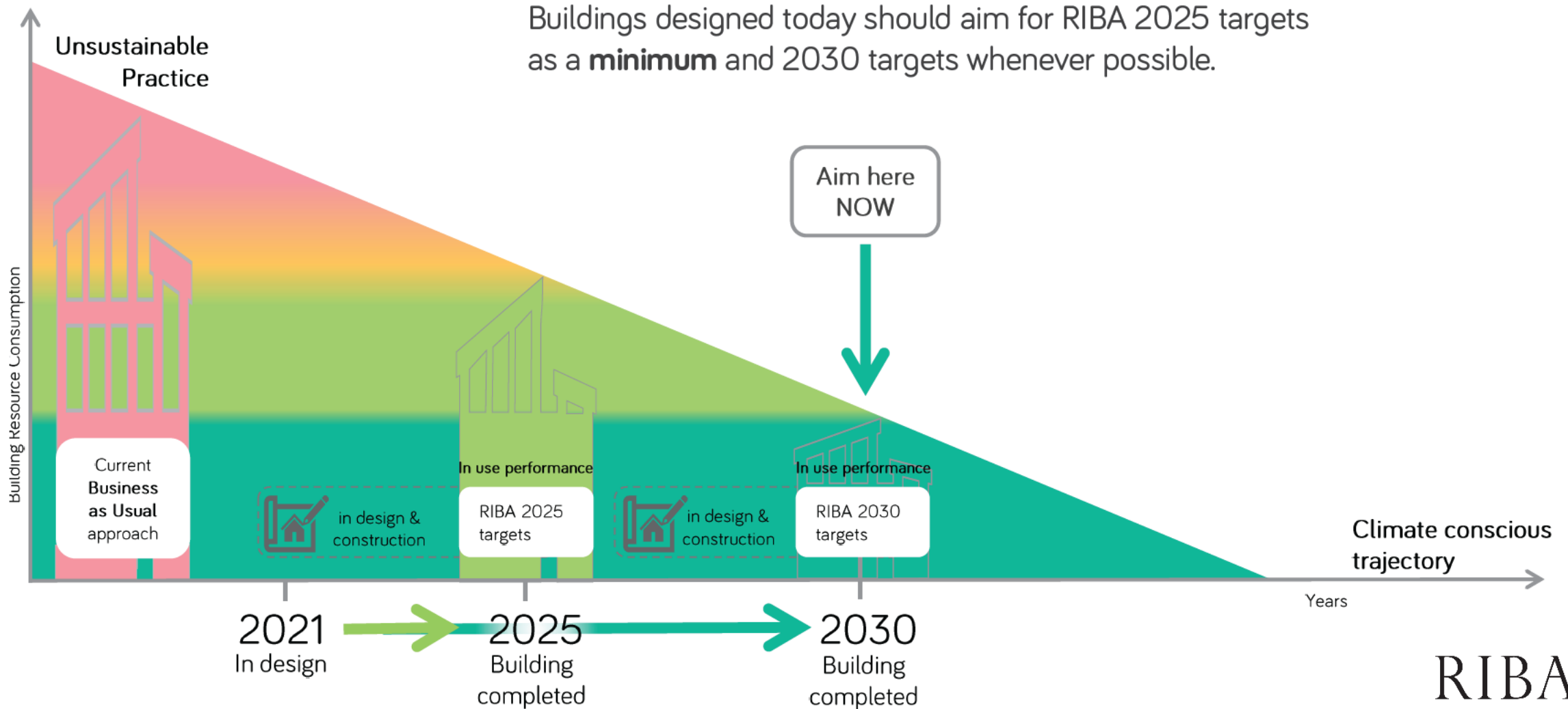
Operational Energy 60 kWh/m²/y (GIA) no gas boilers;
Embodied Carbon LETI Band D 1000 kgCO₂e/m²;
Potable Water Use 110 l/p/day

Health Requirements

Best Practice Health Metrics 	Requirement	References
Overheating	25-28 °C maximum for 1% of occupied hours	CIBCE TM52, CIBSE TM59
Daylighting	> 2% av. daylight factor, 0.4 uniformity	CIBSE LG10
CO ₂ levels	< 900 ppm	CIBSE TM40
Total VOCs	< 0.3 mg/m ³	Approved Document- F
Formaldehyde	< 0.1 mg/m ³	BREEAM

Avoid unintended consequences of poor health and wellbeing by meeting key health metrics set out in the RIBA 2030 Climate Challenge.

RIBA 2030 Climate Challenge Trajectories



Buildings designed today should aim for RIBA 2025 targets as a **minimum** and 2030 targets whenever possible.

Practices commit
to attempting to
meet the targets

2030 Data Submission

- **Predicted gross regulated energy use** (kWh/m²/y) including energy for heating and hot water, lighting, pumps and fans.
- **Predicted gross unregulated energy use** (kWh/m²/y) including end user, plug-in energy use.
- **Predicted on site renewables output**, if applicable (kWh/y).
- **In-Use Gross Operational Energy** (kWh/m² /y) from meter readings/bills over a year so that winter and summer seasons feature in the data.
- **In-Use Potable Water** (Litres/person/day) from meter readings/bills
- **Embodied Carbon** (kgCo₂e/m²) for RICS modules A-C, excluding B6-7

2030 Data Submission

The RIBA provides assurance that all submitted data will remain anonymous and will only be used by the RIBA to:

- grow industry knowledge of trends in building performance
- identify trends in building performance gaps between predicted design targets and actual building performance data
- identify opportunities for improvements for sectoral carbon reductions
- deliver targeted research and knowledge development to the profession
- inform future engagement activity for the RIBA membership

2030 Data Submission

- Signatories who join the Challenge commit to submit data relating to their significant projects.
- We understand that, for some projects, operational data, from energy or water bills, is not available to the practice. If this is the case, it is still helpful for us to know why.
- Whole life carbon assessments are becoming easier to do but still require resourcing by the client and the design team. If they are not undertaken on the project the RIBA does not expect practices to undertake this work just for the RIBA.

Talking to Clients

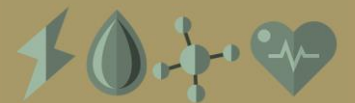
about the 2030 Climate Challenge

Guidance for architects

Guidance for clients

Template letters

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