

# IIGCC real estate roundtable – Advancing best practice for measuring and managing whole life carbon emissions – Part 2

05 October 2022



5 mins	Welcome and introduction	Aleksandra Njagulj, DWS & IIGCC Real Estate Working Group Co-lead
10 mins	Building System Carbon Framework	Luca De Giovanetti, World Business Council for Sustainable Development
10 mins	Net Zero Carbon Pathway Framework	Adam Smith, Better Buildings Partnership
10 mins	Assessing and managing whole life carbon – an investor perspective	Sheun Chan, LGIM Real Assets
5 mins	Update on GRESB 2023 Real estate Standard	Erik Landy, GRESB
45 mins	Panel discussion	Moderated by Peter Sweatman, Climate Strategy & Partners
5 mins	Close	Hugh Garnett, IIGCC

# Building System Carbon Framework

Luca de Giovanetti, World Business Council for Sustainable Development

**IIGCC**  
The Institutional Investors  
Group on Climate Change



# Built Environment Transformation project

Acting collectively to accelerate the transformation towards a decarbonized, circular, nature-positive and equitable built environment

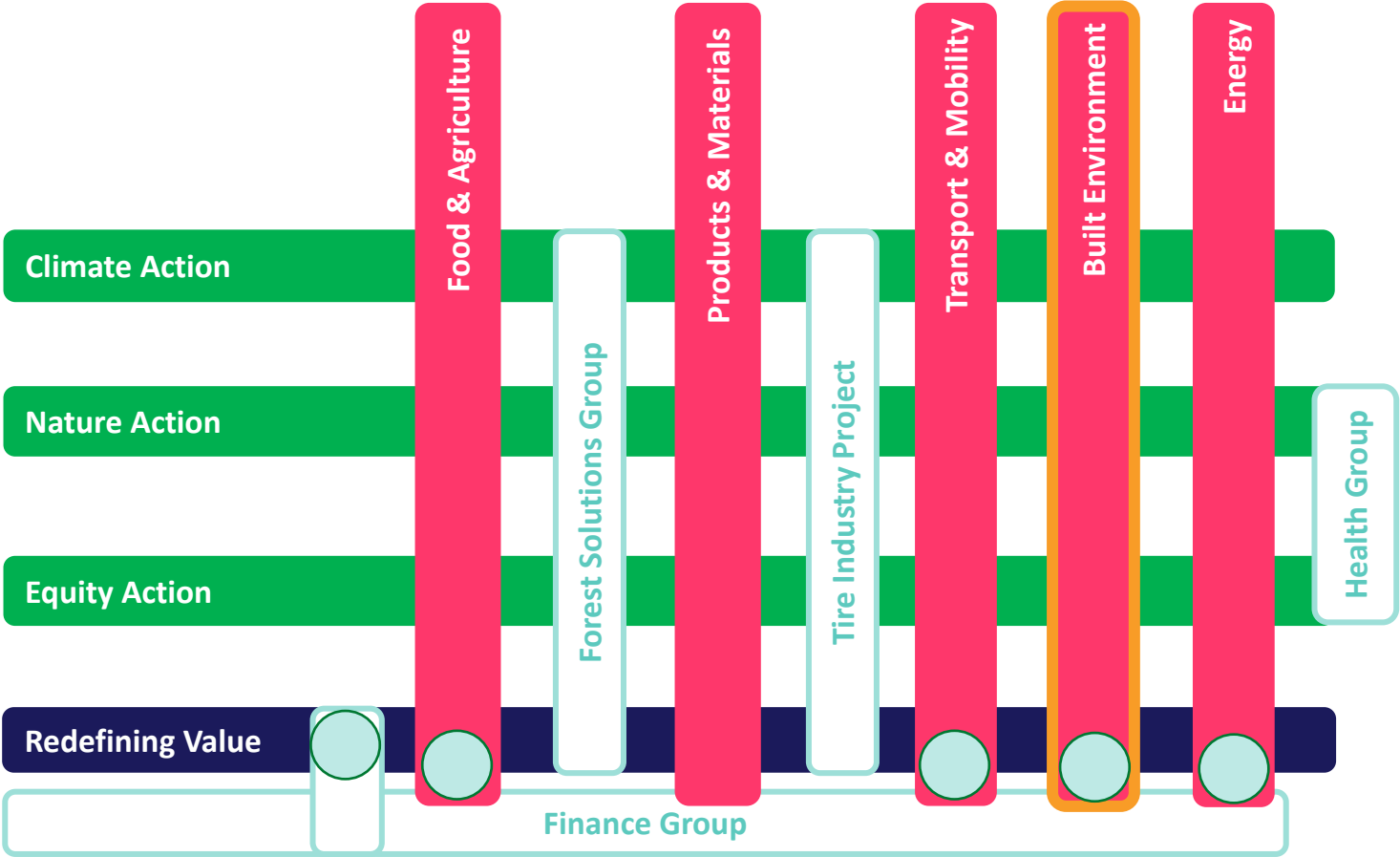
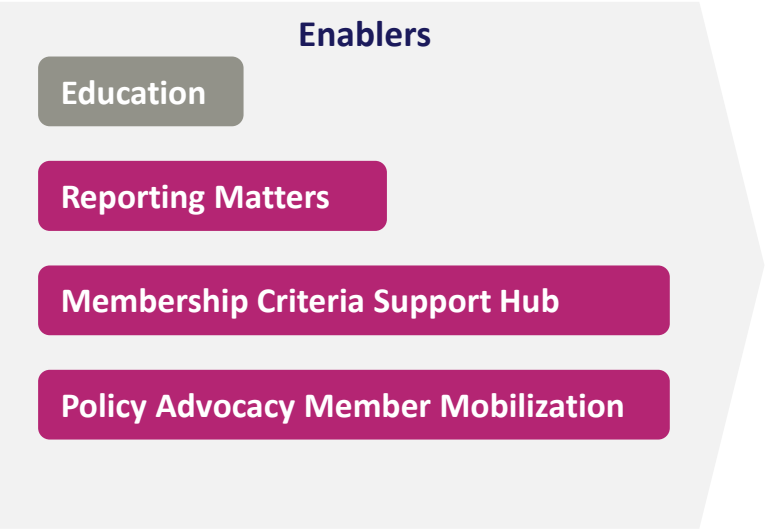
# WBCSD – Business leadership for a sustainable future



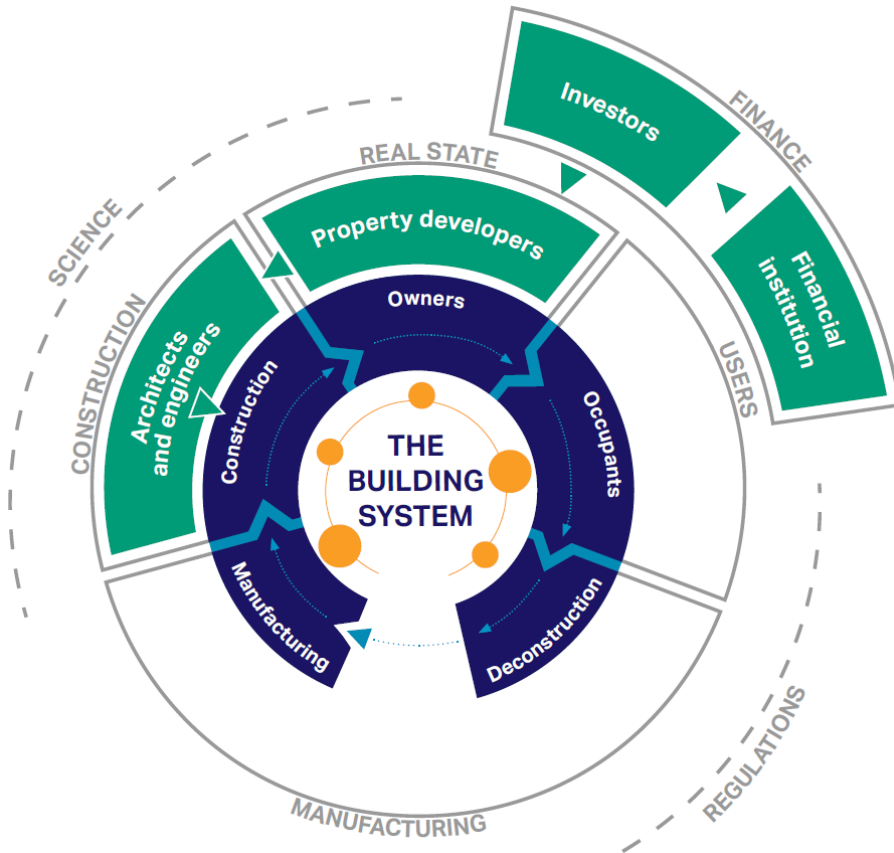
The premier global, CEO-led community of over 200 of the world's leading sustainable businesses working collectively to accelerate the system transformations needed for a net zero, nature positive, and more equitable future.

# WBCSD Transformation Matrix

- Services
- Pathways: value chains & system transformation
- Imperatives
- Sectors and Groups: member communities
- Redefining Value
- Education



# Built Environment Transformation



Acting collectively to  
accelerate the  
transformation towards a  
decarbonized, circular,  
nature-positive and  
equitable built environment



Net Zero

Nature-  
positive

Circular

Equitable

Source: WBCSD Building System Carbon Framework (2020)

# Our journey 2018 – 2022

## CM19 Lisbon



Oct 2019

## WBCSD membership criteria



Oct 2020

## Vision 2050 & Living Spaces Pathway



Mar 2021

## Strategy 2022-2027



Oct 2021

Nov 2021

**2022:**

- Net Zero Buildings – How Low can we go?
- Nature-positive BE Framework
- Guidance to measure circularity
- Finance sector “Primer”
- Green Lease guide

Dec 2018

June 2020

Jan 2021

July 2021

Oct 2021

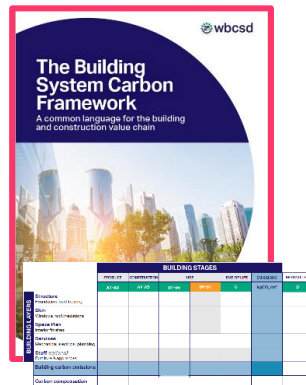
## Scaling the circular built environment



## TCFD Construction Forum



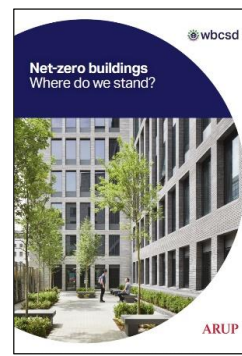
## Building System Carbon Framework



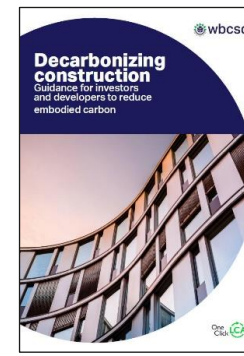
## Digitalization



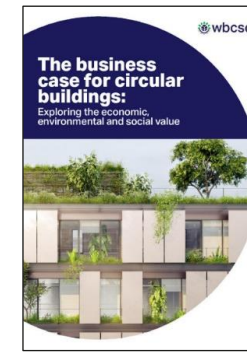
## Net Zero Buildings



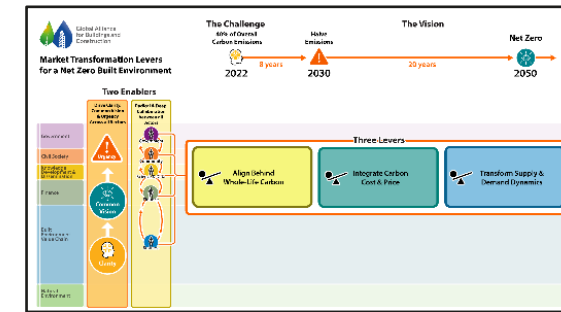
## Embodied carbon: Investor guidance



## The business case for circular buildings

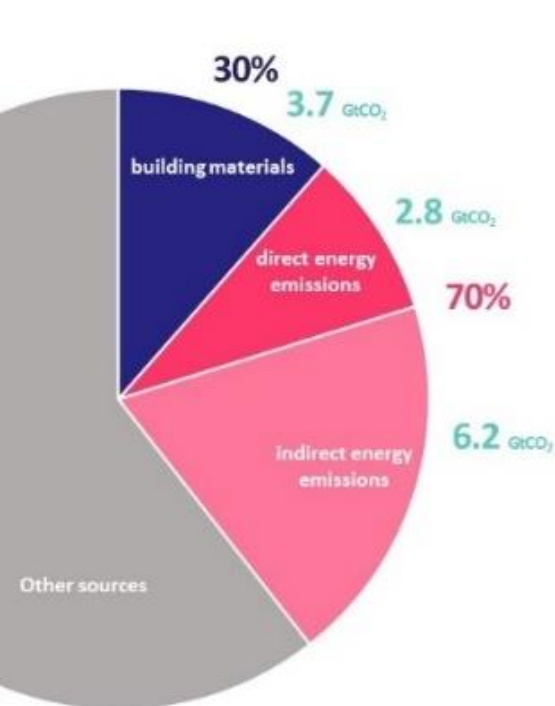


## Market Transformation Levers (COP26)



# Built environment decarbonization: Our vision

**Accelerating the achievement of *net-zero emissions* across the *entire built environment lifecycle* no later than 2050 through *system-wide collaboration*.**



The building sector represents approx. **40% global energy-related CO<sub>2</sub> emissions** > 14 Gt per year



**Every 5 days**  
a surface of the size of  
Paris is built

Source: Global Status Report 2021, Global Alliance for Building and Construction

## GOAL

**HALVE by 2030 and achieve NET-ZERO by 2050**  
**of the BUILT ENVIRONMENT LIFECYCLE emissions**

### Operation - Net Zero :

- 2030: all new buildings
- 2050: all buildings

### Embodied carbon:

- 2030: -40% CO<sub>2</sub> emissions
- 2050: Net Zero

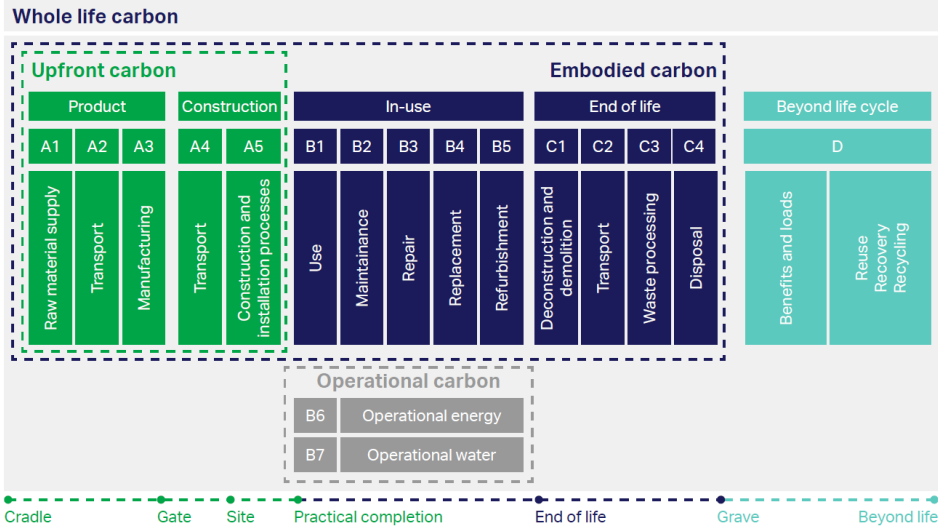


# The Building System Carbon Framework

## “Measuring Whole Life Carbon”

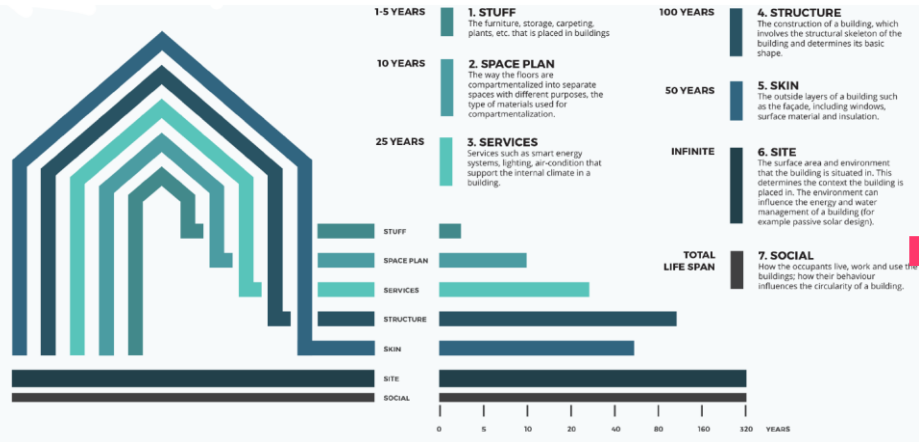
- Transparently account and report carbon emissions
- Clarity on whole life carbon and system emissions
- Common language and indicator across the building system

WHEN



WHERE

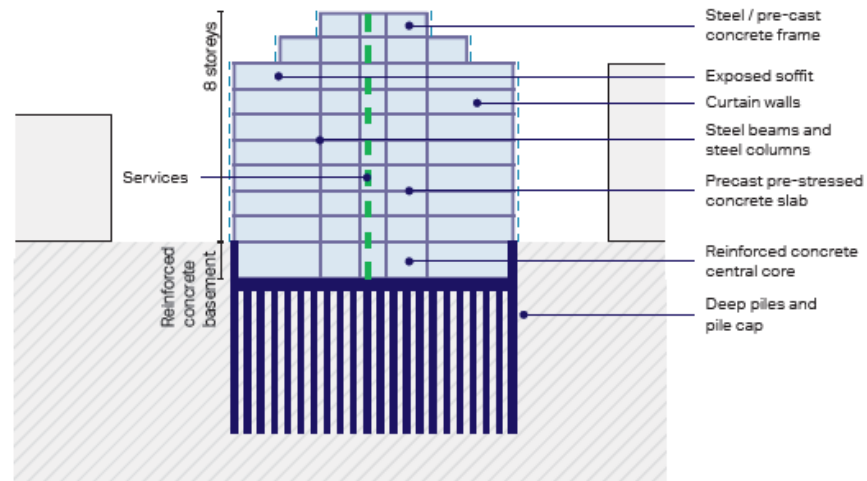
Figure 5: Building model consisting of the building related layers based on the sharing layers<sup>9</sup>



		BUILDING STAGES						
		PRODUCT	CONSTRUCTION	USE		END OF LIFE	EMISSIONS	BEYOND LIFE
		A1-A3	A4-A5	B1-B5	B6-B7	C	kgCO <sub>2</sub> /m <sup>2</sup>	D
BUILDING LAYERS	Structure Foundation, load-bearing							
	Skin Windows, roof, insulations							
	Space Plan Interior finishes							
	Services Mechanical, electrical, plumbing							
	Stuff <i>(optional)</i> Furniture & appliances							
	Building carbon emissions							
	Carbon compensation Removals and offset							

# All electric office building, London, UK

Case study 02



## Main results

Figure 18: Embodied Carbon at Practical Completion (A1-A5)

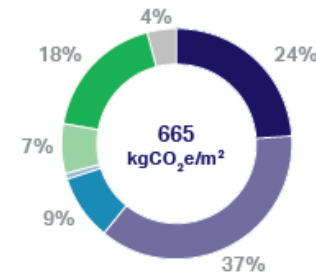
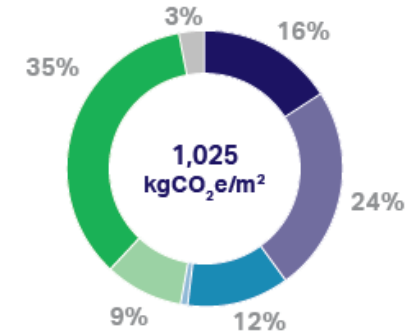


Figure 19: Embodied Carbon over the Life Cycle (A-C)



- Substructure
- Superstructure
- Façade
- Internal walls & partitions
- Internal finishes
- FF&E
- Building Services
- Energy & water use
- Site emissions

**TYPE**  
Office, New build

**LOCATION**  
London, UK

**DEVELOPMENT STAGE**  
Building's handover

**GIA**  
40,065 m<sup>2</sup>

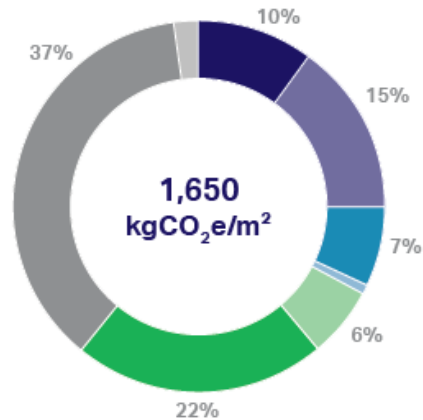
**RATING SCHEME**  
LEED 2014 Gold  
BREEAM 2014 Excellent  
Ecohomes Excellent

**TOOL**  
OneClick LCA & Arup PECC tool

**PROJECT DATA**  
Late design stage information: engineers' quantities from calculations and models and cost plan. Allowance made for services embodied carbon.

**ANNUAL ENERGY CONSUMPTION**  
109 kWh/m<sup>2</sup>/year

Figure 17: Whole life carbon (A-C)



## BUILDING STAGES

		PRODUCTS	CONSTRUCTION	USE		END OF LIFE	EMISSIONS	BEYOND LIFE
		A1-A3	A4-A5	B1-B5	B6-B7	C	kgCO <sub>2</sub> e/m <sup>2</sup>	D
BUILDING LAYERS	<b>Structure</b> Substructure and superstructure	392	11	0		5.0	408	-107
	<b>Skin</b> Façade	59	1	59		0.6	120	-33
	<b>Space plan</b> Partitions and internal finishes	51	2	53		0.9	107	-7
	<b>Services</b> Building services, energy and water use	120	1	240	620	1.3	981	-60
	<b>Stuff</b> Fittings, furnishings and equipment (FF&E)	0		0			0	0
	<b>Site emissions</b> Waste, electricity and fuel		30				30	
	<b>Building carbon emissions</b> Embodied and operational	623	44	352	620	8	1,647	-208

# Report: “Net-zero buildings: Where do we stand?” (2021)

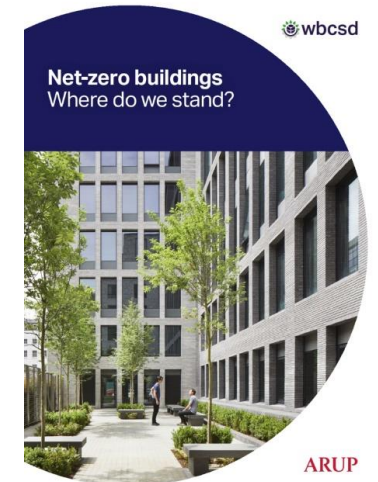
## Key messages:

1. Measure **whole life carbon** in all building projects
2. Develop and **share openly** consistent and transparent carbon intensity and benchmark data
3. Start setting clear and **explicit targets**
4. Align on “**net zero**”, including a valid approach to residual emissions
5. Achieve **wider collaboration** as individual organizations acting is not enough

**Call to action: conduct WLCA and publish results to create body of evidence and foster shared learning**

**Net-zero buildings: How low can we go? (on embodied carbon)**  
*Coming soon - Nov 2022*

**We need to start building **today** what we need for **2030**.**



[\*\*Download report\*\*](#)

Figure 17: Whole life carbon (A-C)

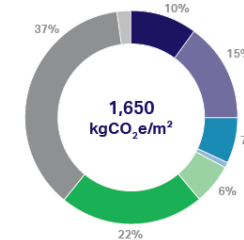


Table 4: Building system carbon framework

	BUILDING STAGES						
	PRODUCTS	CONSTRUCTION	USE		END OF LIFE	EMISSIONS	BEYOND LIFE
	A1-A3	A4-A5	B1-B5	B6-B7	C	kgCO <sub>2</sub> e/m <sup>2</sup>	D
Structure Substructure and superstructure	392	10.8	0	5.0	408	-107.2	
Skid Facade	59	0.5	59		0.6	120	-33.1
Space plan Partitions & internal finishes	51	1.8	53		0.9	107	-7.4
Services Building services, energy and water use	120	0.5	240	619	1.3	991	-60.0
Stuff Furniture, furnishings and equipment (FF&E)	0	0.0	0		0.0	0	0.0
Site emissions Waste, electricity and fuel		30				30	0.0
Building carbon emissions Embodied and operational	623	44	352	619	8	1,647	-208

# Signals of change

The Arup logo, consisting of the word "ARUP" in a bold, red, serif typeface.

**8 November 2021:** Arup commits to whole lifecycle carbon assessments for all buildings work and withdrawal from fossil fuels from next year.

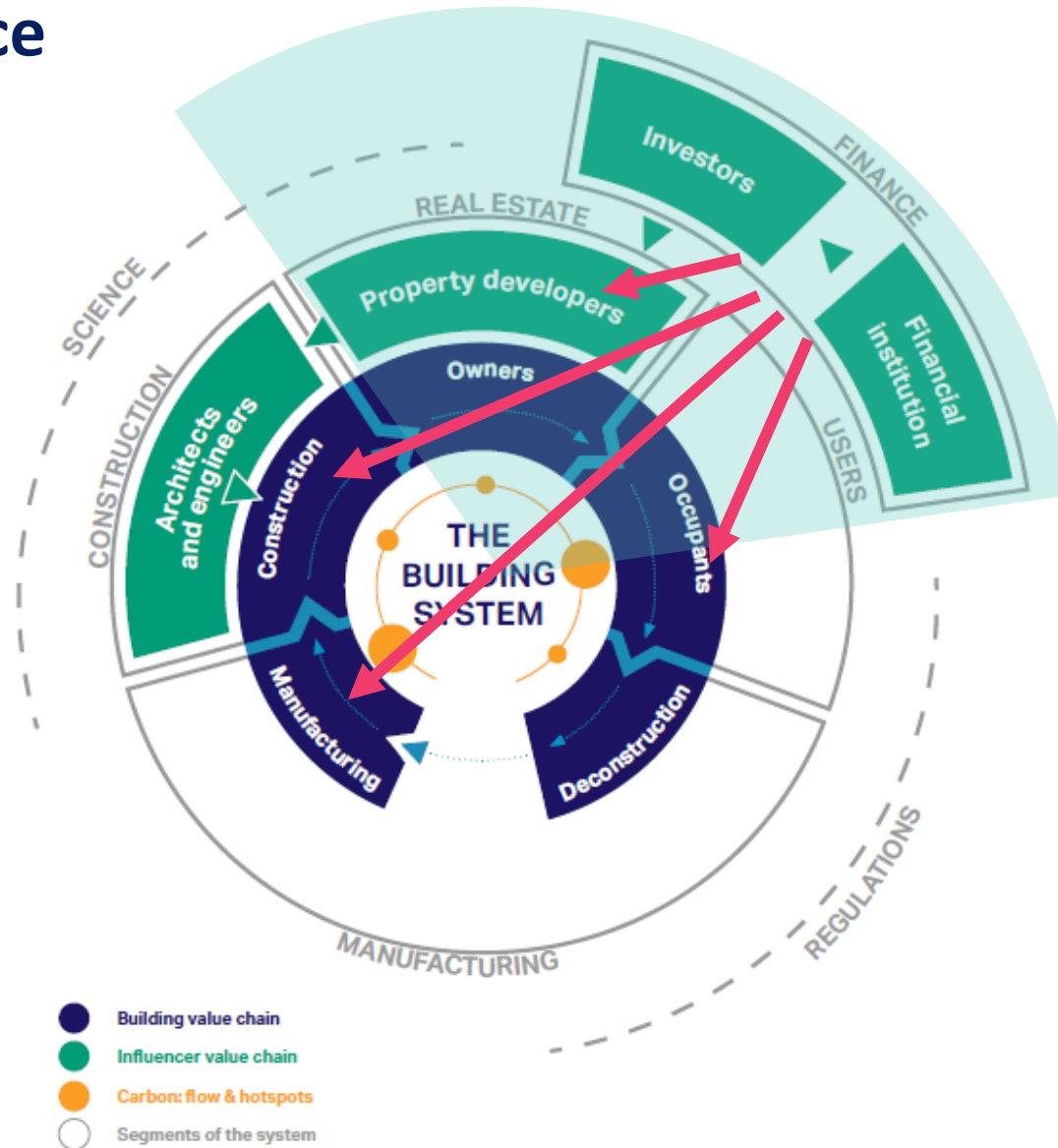
The Ramboll logo, featuring the word "RAMBOLL" in white, uppercase, sans-serif letters inside a blue rectangular box with a white diagonal line.

**1st June 2022:** By 2030, Ramboll will reduce CO2 emissions from all new building projects globally by 50%.



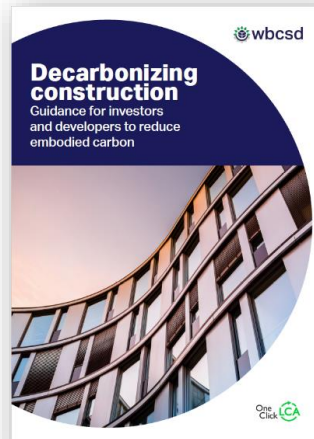
**Net Zero by 2028:** 100% CO2 neutral portfolio, including both operational and embodied carbon, no external offsetting required.

# The Role of Finance



# What led us to the finance narrative in the built environment?

Report: Decarbonizing Construction - Guidance for investors and developers to reduce embodied carbon



[Download report](#)



## Who is this for?

How investors and developers can set requirements to reduce embodied carbon in projects they finance.

Used by different stakeholders:

- Investors
- Developers
- Tenants
- Consultants and designers
- Design-build contractors
- \*Cities are also playing some of these roles.

## What does it do?

It condenses over **50 requirements** - leading embodied carbon reduction practices across all project life-cycle phases into a single report. Measures are grouped into:

### *Five categories:*

1. Create a carbon policy
2. Targets and transparency requirements
3. Prioritize circularity,
4. Design optimization
5. Low-carbon procurement

## [Read](#) the Insight by Roland Hunziker & Yi Sun:

Decarbonizing the 40% - How the finance sector can drive the transformation to a net-zero built environment

# ‘Primer’ document outline

“How the finance sector can accelerate decarbonization of the built environment”

## Paper objective

- To **mobilize** the finance sector in the built environment
- Help **define** a common language and narrative
- Highlight emerging **demand drivers**
- Focus on **opportunities, actions and implementation**
- Aims to **break down the processes and consolidate key information** for various stakeholders within the value chain

## Content

- The **role** of the financial industry in the decarbonization of the Built Environment
- Typical **barriers and limitations**
- How the financial sector can support the transition to net zero - time for action
  - Key areas of **action**
  - A **Whole Life Carbon approach**
- Stakeholder specific **toolkits**:
  - Debt providers (lenders)
  - Asset Owners
  - Asset Managers

- Insurers
- REITS
- Data Providers

# Our contact details

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# Time to Transform.



Geneva, Amsterdam, Beijing, Delhi, London, New York, Singapore

# Net Zero Carbon Pathway Framework

Adam Smith, Building Better Partnership

**IIGCC**  
The Institutional Investors  
Group on Climate Change



# The Better Buildings Partnership

## The Climate Commitment and embodied carbon

Presentation at IIGCC roundtable  
5<sup>th</sup> October 2022

A collaboration of the UK's leading property owners who work together to improve the sustainability of the UK's existing commercial buildings

## Our aim

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Enable market transformation through sustainability leadership and knowledge sharing across the property industry

# Our membership of around 50 property companies collaborate on a range of market transformational projects



49  
MEMBERS

£270bn+  
AUM

450m+  
SQ FT

# BBP Climate Commitment was launched in 2019 and represents one of the most ambitious pledges available to real estate companies



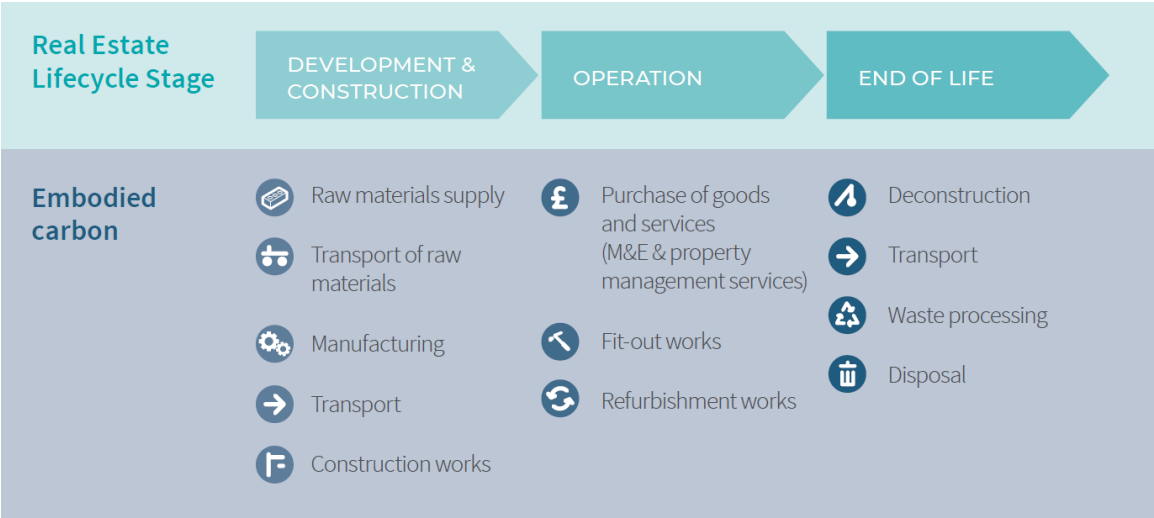
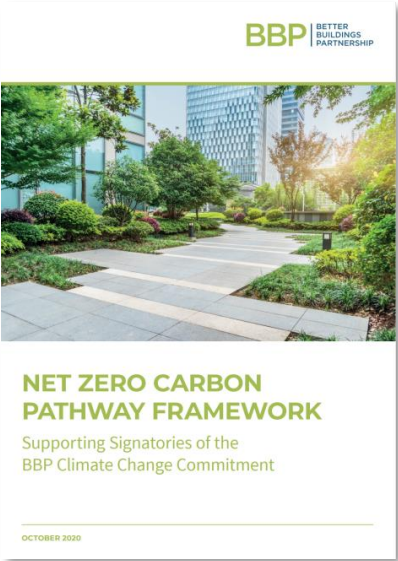
\*Grosvenor Great Britain & Ireland and Grosvenor Europe are listed separately.

# The Climate Commitment places four key requirements on signatories, and we provide guidance to signatories

1. Publish a **net zero carbon pathway**, including:
  - Operational carbon covering whole building performance
  - Embodied carbon of development, refurbishment & fit-out works
  - Following principles of the energy hierarchy
2. **Annually disclose progress** towards the net zero carbon pathway
3. **Publicly disclose energy performance** of their portfolios. As a minimum at a portfolio level by geography, and ideally at a property level. Also support the development of industry benchmarks
4. **Develop climate resilience strategies** for their portfolios & work together to develop consistent industry disclosure on climate change risks.



# The Net Zero Carbon Pathway Framework was published in 2020 and refreshed in 2022 and highlights the scope around embodied carbon



**Table 1: BBP Climate Commitment Carbon Boundaries**

✓ = activities that should be included within Signatories net zero carbon target.

Activities which generate GHG emissions for real estate investments (directly or indirectly)	Activities controlled and managed by landlords*	Activities controlled and managed by occupiers	Corporate / Head Office
Energy to operate buildings (electricity, fuels & heat networks)	✓	✓	●
Water to operate buildings	✓		●
Waste generated during operation	✓		●
Refrigerants (Fugitive emissions)	✓		●
Purchase of goods and services (M&E & property management services)**	✓		●
Business travel (excluding that associated with development works)			●
New development works	✓		●
Refurbishment works	✓	✓	●
Fit-out Works	✓	✓	●
End of life***			



# Commitment signatories are at different stages of managing embodied carbon emissions...

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59% of signatories are setting embodied carbon targets



76% are undertaking Whole Life Carbon Assessments



65% have included occupier-controlled fit outs in their pathways to net zero



47% are referencing a plan to address tenant-controlled fit-outs

...but progress generally lags behind operational energy / carbon targets

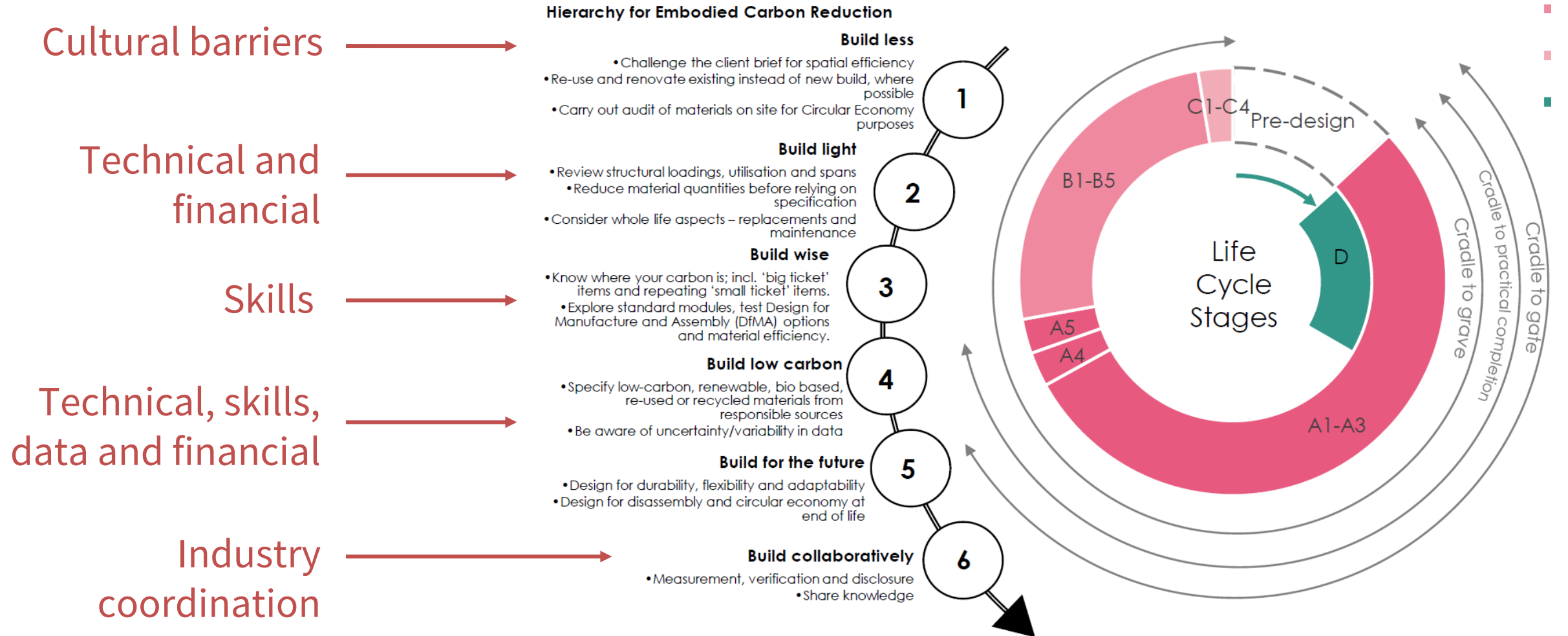


94% of signatories are setting operational energy targets



68% of signatories are setting EUI targets for new build properties

# LETI's Embodied Carbon Reduction Hierarchy captures the sequence of steps well, but also highlights the stark reality of the challenge we face



# BBP member case study: British Land



## 100 Liverpool Street

- 389kg per m<sup>2</sup> embodied carbon, compared to 2020 industry average of 1000kg per m<sup>2</sup>
- Retained 50% of existing structure

## Embodied Carbon Targets

- 50% reduction in embodied CO<sub>2</sub>e per sqm in construction by 2030
  - Whole life carbon assessments for all new developments, refurbishments and cat A fit-outs
  - Establish internal carbon price for investment decisions
  - Pilot innovative uses of low-carbon materials
  - Consider REGO-backed power on developments
- 50% reduction in 'in-use' embodied CO<sub>2</sub>e per sqm from new developments by 2030
  - Implement software to track embodied carbon
    - Embed in existing procurement and maintenance systems
  - Train property managers and other relevant staff to log embodied carbon in-use when equipment/furnishing is replaced



# BBP member case study: Cadogan

## Net Zero Pathway Actions on Embodied Carbon

- **New design standards:** for all new development projects will cover embodied carbon targets as well as opportunities arising from circular economy models.
- **Supply chain engagement:** proactive engagement with partners and suppliers regarding sustainability expectations and their own environmental performance will continue, sharing best practice and supporting suppliers
- **Improved data and reporting:** new tracking of embodied carbon for every development. Supply chain tracking and reporting.

FIGURE 4. EMBODIED CARBON TARGETS kgCO<sub>2</sub>e/m<sup>2</sup> (WHOLE BUILDING GIA)

PROJECT TYPE		2021-2025 TARGET RANGE	2025-2030 TARGET RANGE	2030 TARGETS
NON-RESIDENTIAL	Minor Refurbishment	280 - 227	227.5 - 175	< 175
	Major Refurbishment	512 - 416	416 - 320	< 320
	New Build	800 - 650	650 - 500	< 500
RESIDENTIAL	Minor Refurbishment	180 - 135	135 - 90	< 90
	Major Refurbishment	300 - 225	225 - 150	< 150
	New Build	600 - 450	450 - 300	< 300



## 1 Sloane Gardens

- Previously mixed-use site is being developed into a 30-bedroom hotel with a new rooftop restaurant, scheduled to open in 2022.
- Retains 42% of the existing structure by volume, specifically the foundations and façade on three elevations, preserving the historic character of the site and significantly reducing the carbon embodied in the structure.
- Use of low carbon concrete and reuse of materials including bricks, stonework and railings

The BBP are part of a radical industry collaboration to develop a UK standard on net zero carbon buildings

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# UK Net Zero Carbon Buildings Standard

[www.NZCBuildings.co.uk](http://www.NZCBuildings.co.uk)



The Institution of  
StructuralEngineers



RIBA   
Architecture.com



# Thank you for listening

Adam Smith  
Climate Change Programme Lead  
[a.smith@betterbuildingspartnership.co.uk](mailto:a.smith@betterbuildingspartnership.co.uk)

# Assessing and managing whole life carbon – an investor perspective

Shuen Chan, LGIM Real Assets

**IIGCC**  
The Institutional Investors  
Group on Climate Change



# IIGCC Real Estate Roundtable

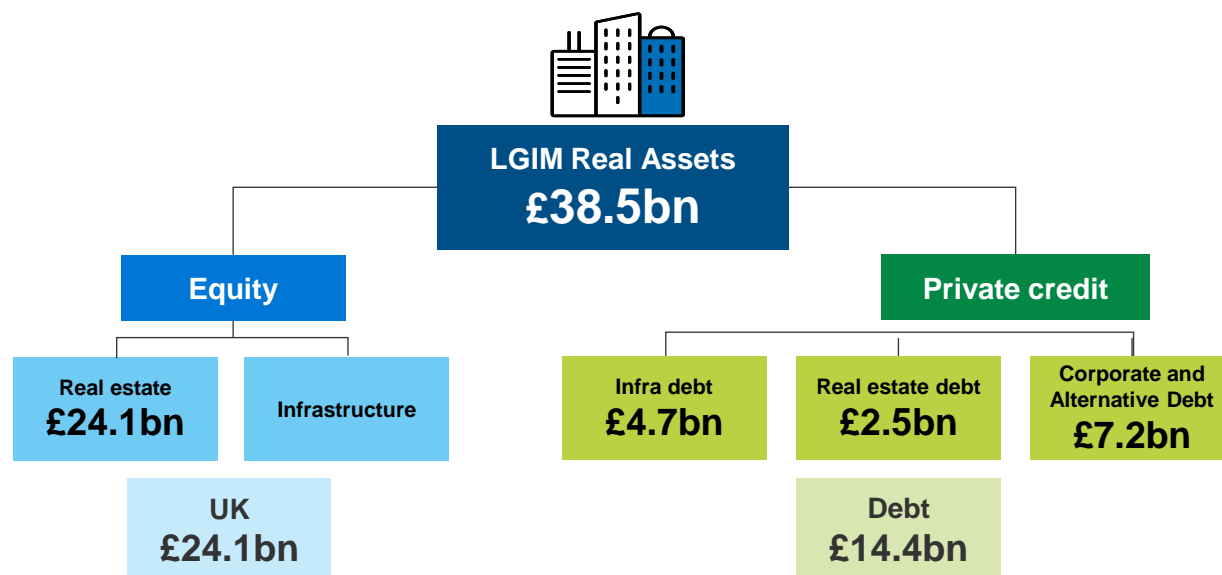
Advancing best practice for measuring and managing  
whole life carbon emissions

**05 October 2022**



# Introduction to LGIM Real Assets

One of the UK's largest real assets managers with 50 years' experience, committed to delivering solutions that meet the long-term needs of our clients, businesses and communities



## Scale and expertise

Unrivalled expertise in asset creation and origination, identifying areas of thematic alpha with the potential to outperform.

## Investing for now and the future

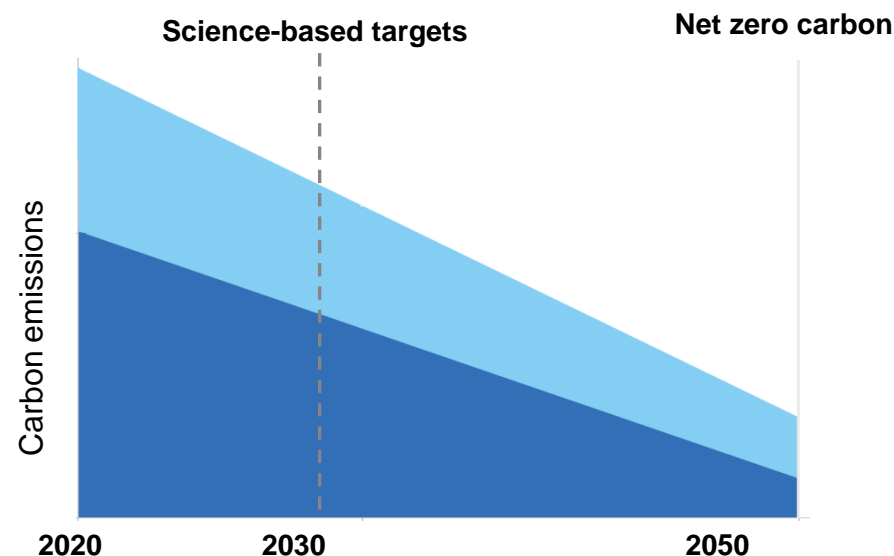
We invest responsibly, considering the social, economic and environmental impact of our investment decisions, taking a long-term view to bring about positive change.

## Valuing our stakeholders

We believe in strong relationships and shared ethos, taking time to understand the complex needs of our clients, borrowers and occupiers.



# LGIM Real Assets commitment to net zero



**Scope 1/2** Landlord purchased

**Scope 3** Occupier purchased



## Our net zero carbon principles across our real estate equity portfolios

### Net-zero carbon

Our commitment is to achieve net-zero carbon across our whole real estate portfolio by 2050 or sooner. This commitment goes beyond our landlord operations, covering whole building emissions which include our occupiers.



### Science-based targets

Our science-based targets support our trajectory to net zero out to 2050. We will aim to reduce operational carbon and energy intensity of our landlord-controlled areas and the carbon intensity of our occupiers by 55% by 2030.



### Best practice standards

To achieve net zero, we are firmly committed to the principles as defined by the UK Green Building Council framework:

- We will measure and reduce embodied carbon
- We will use the energy hierarchy to drive down the demand of our properties to lower energy levels
- We will increase renewable energy supply and only consider verified offsetting as the final step



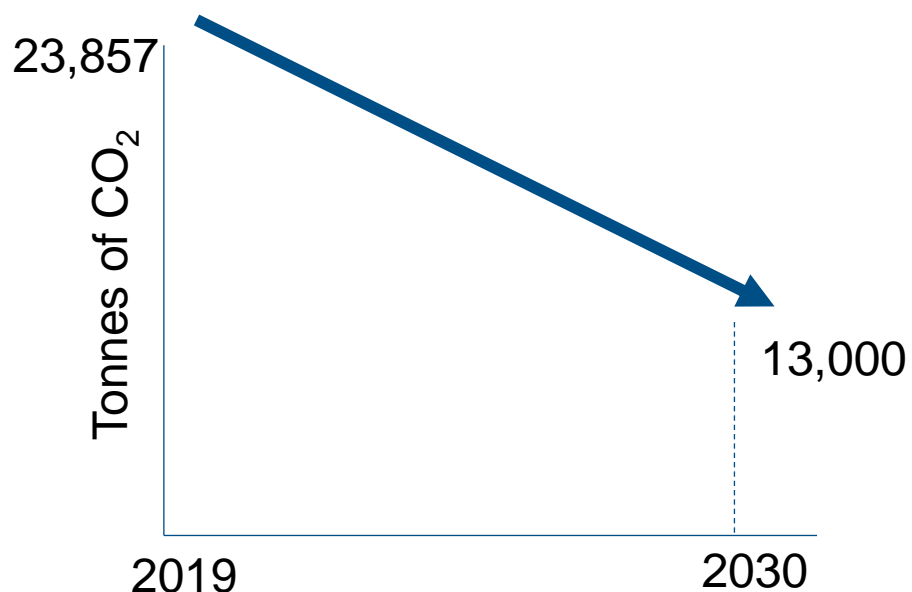
# Setting science-based targets to 2030

## Scope 1 & 2 emissions (landlord purchased energy)

Reduce absolute carbon emissions to 13,000 tonnes by 2030 from 2019 baseline

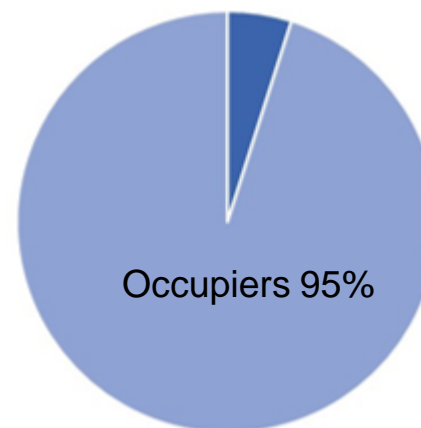
Gas removal is key to meeting our SBT target

We need to also drive down energy demand (NZC ~ 55% reduction in kWh/m<sup>2</sup> by 2030)

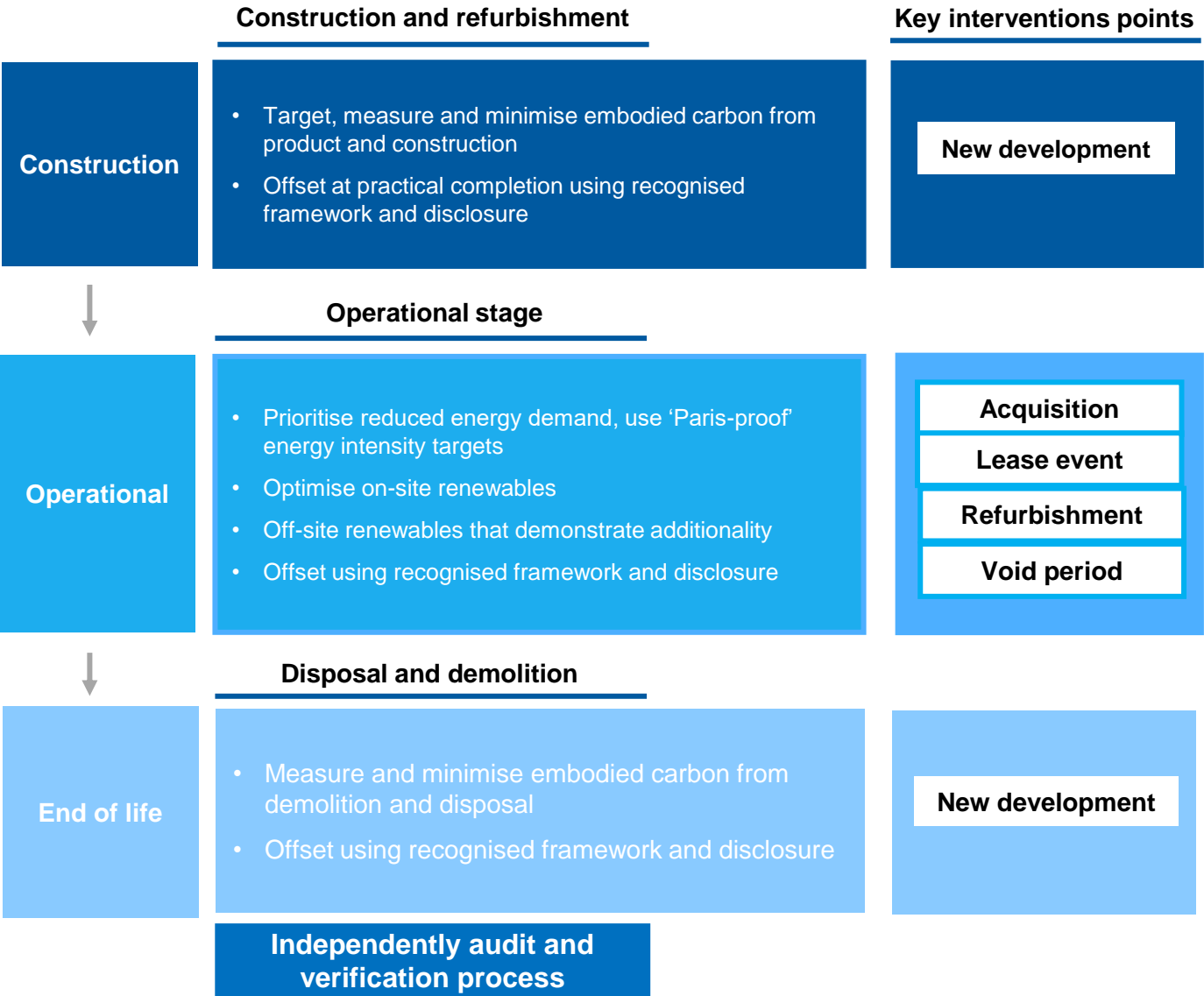


## • Scope 3 emissions (occupier purchased energy)

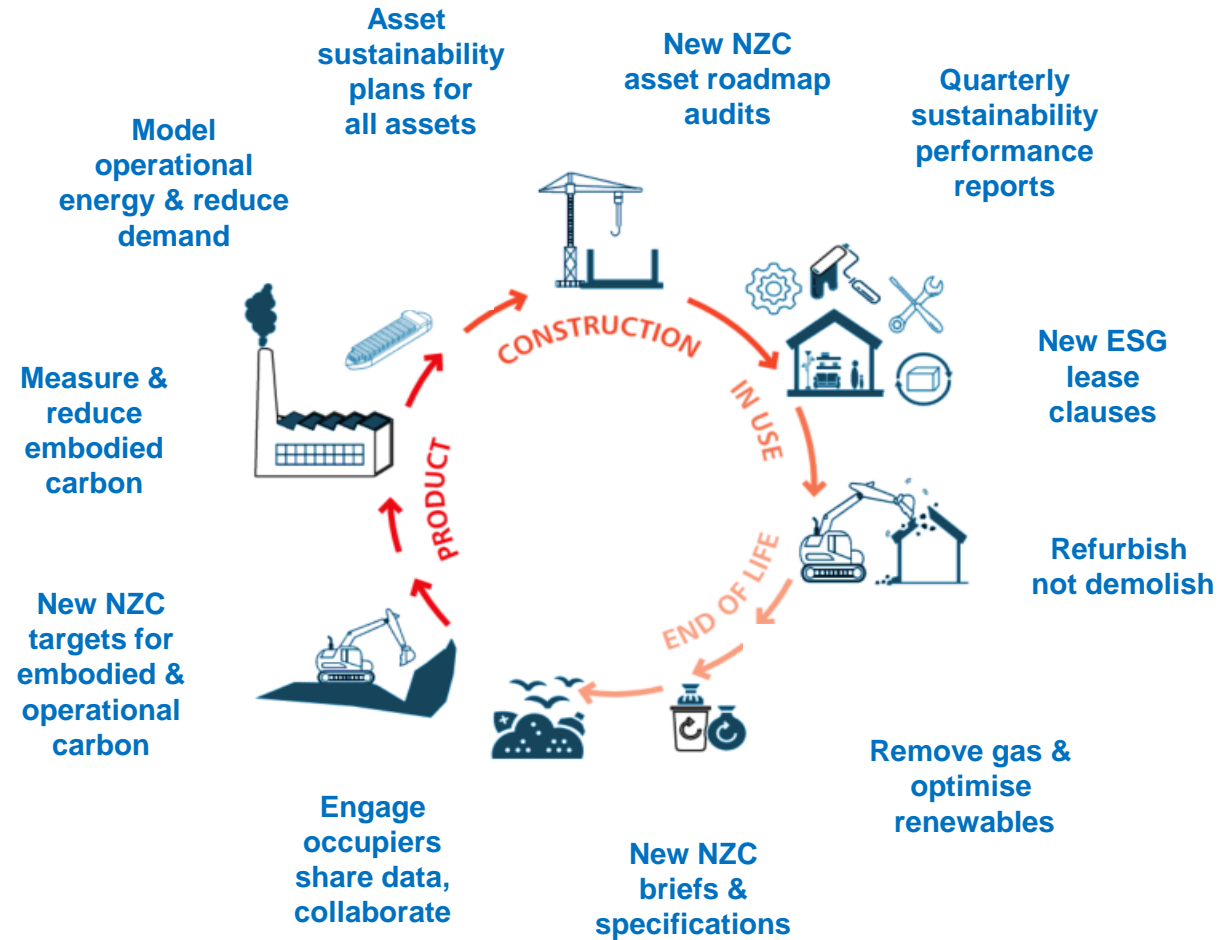
- Reduce carbon emission intensity (tonnes/m<sup>2</sup>) by 55% by 2030 from 2019 baseline
- Limited data – initial target to gather actual data
- Focus on engagement, data and collaboration



# Achieving net zero across the life cycle



# Measuring and managing whole life carbon



# Driving reductions in embodied carbon

## Already established

### New developments and refurbishment

- Net-zero targets for embodied carbon required on all new developments and major refurbishments
- Embodied carbon studies required on all new developments and major refurbishments
- Investment committee requires embodied carbon metrics to inform decisions
- Net zero fit-out guidance for offices has been developed
- New net-zero tools (e.g. shed modelling tool and net-zero audits) – include an indicator of impact of building improvements on embodied carbon

## Work in progress

### Maintenance and Operation

- To develop new procurement requirements around embodied carbon
- Work with our supply chain and consultants to gather data and develop targets.
- Quantify the embodied carbon of key maintenance / plant replacement / fabric improvement
- Establish a new ESG project reporting system, to track and report on ESG KPIs for all projects, including embodied carbon performance

# Case study on measuring and reducing whole life carbon



# Case study - Tempo Maidenhead

## Project Overview

### Property Details

- 110,000 sq ft offices
- Constructed 2000
- 18,000 sq ft floorplates

### Existing Building

- Services at end of life
- Glazing starting to fail
- Dated appearance
- No external space

### Tempo Brief

- Update the architectural appearance
- Structure and cladding retained where possible
- New building services including lifts
- New external space, cycle and shower facilities
- Low embodied and operational carbon
- Increase NIA without adding a floor



# Tempo, Maidenhead

ESG key driver to deliver best in class office development



A full refurbishment and repositioning of Tempo in Maidenhead is due to **complete in Q1 2023**

**130,000 sq ft** with **roof terracing, winter gardens** and **statement double height entrance**

Targeting a **minimum EPC rating of B, BREEAM Outstanding** and **NABERS 'Design for Performance' certified**

Proceeding with an **all-electric strategy** for fuel sources, including solar PV panels over the roof. **EV charging points** available for all occupiers

Providing a **best in class** building that is of absolute **relevance to the occupier** through tenant amenity, wellness and market leading ESG credentials

Integrating Smart building technology and digital connectivity – **SmartScore and WiredScore certified**

Source: LGIM Real Assets

# Embodied Carbon – Tempo

## Upfront Carbon and Net Zero

### Various Embodied Carbon Benchmarks

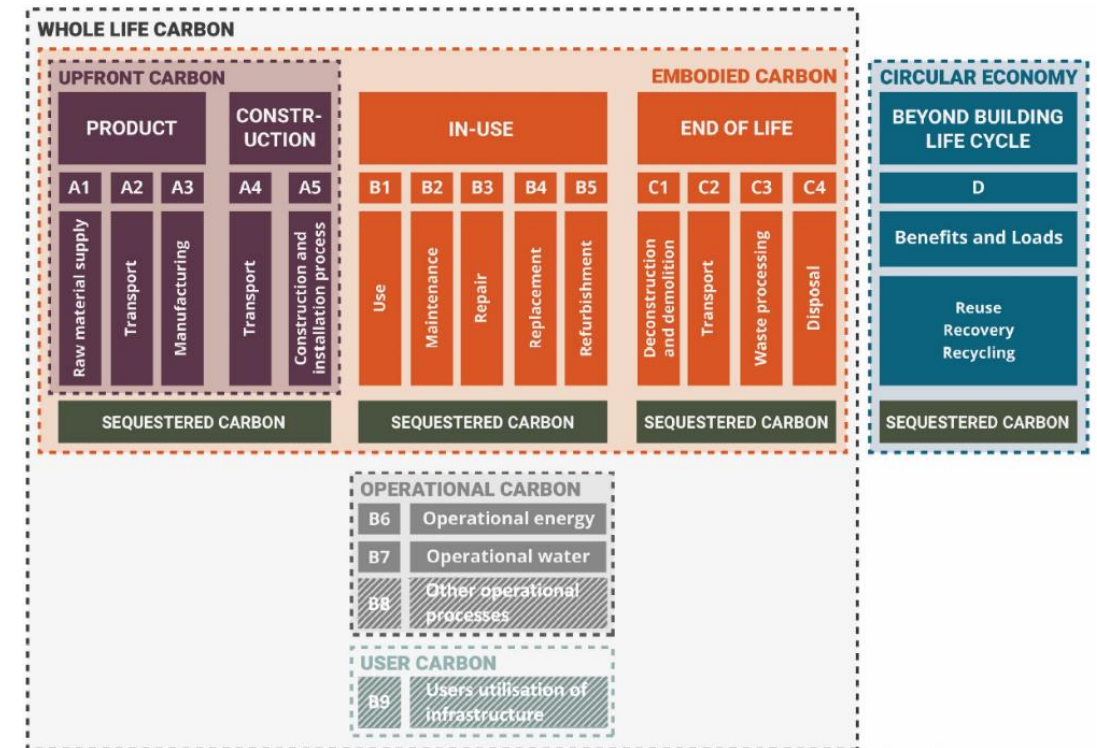
- RIBA, RICS, LETI and UKGBC
- All benchmarks require lower carbon levels towards 2050
- Construction carbon now referred to as “Upfront Carbon”
- Current LETI target 600 kg Co2/m2 falling to 350 kg by 2030
- RIBA “business as usual” 1,400 kg Co2/m2
- RIBA 2025 970 kg CO2/m2 falling to 750 kg by 2030

### Process

- Carbon assessor appointed on all projects
- Carbon impact now sits alongside, cost, quality etc
- Carbon assessor now integral to the design process
- Carbon intensity reported at each design stage

### Tempo Carbon Intensity

- Tempo is achieving (A1-A5) 393 kg Co2/m2 (-36% LETI 2025)
- Closely tracked through procurement and construction



Source: LETI

# Operational Energy – Tempo

## Net Zero Targets and Performance Analysis

### Net Zero Carbon – Energy in use targets

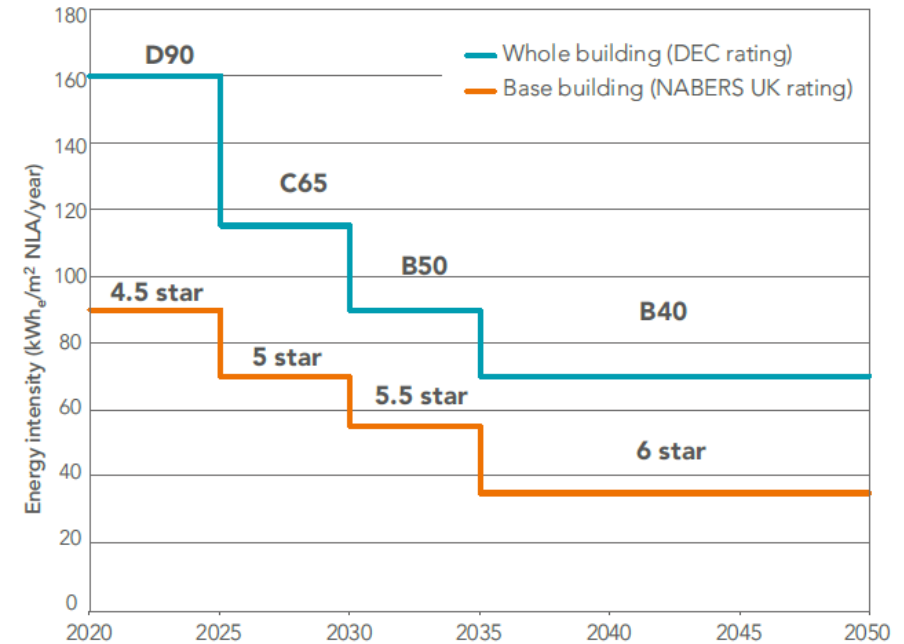
- LETI / UKGBC also set energy in use targets
- Net zero targets progressively fall towards 2050
- Target is to progressively move to “Paris Proof” by 2050
- Project brief is to get as close to Paris proof now

### Energy In Use forecasts during design

- Undertake energy modelling during design stage
- Estimated NABERS rating through DFP - ★
- CIBSE TM54 Analysis - ★
- Part L Compliant Modelling - ★

### Design for Performance modelling

- Predicts real world energy consumption / NABERS rating
- Time consuming and expensive but accurate
- Sets accurate target for property managers to achieve
- Tenant energy is included for Net Zero so need to influence fit out and use of the premises



Scope	Metric	Interim Targets			Paris Proof Target
		2020-2025	2025-2030	2030-2035	2035-2050
Whole building energy	kWh <sub>e</sub> /m² (NLA) / year	160	115	90	70
	kWh <sub>e</sub> /m² (GIA) / year	130	90	70	55
	DEC rating	D90	C65	B50	B40
Base building energy	kWh <sub>e</sub> /m² (NLA) / year	90	70	55	35
	kWh <sub>e</sub> /m² (GIA) / year	70	55	45	30
	NABERS UK star rating	4.5	5	5.5	6
Tenant energy	kWh <sub>e</sub> /m² (NLA) / year	70	45	35	35

NLA = net lettable area GIA = gross internal area

# Operational Modelling - Tempo

## Design For Performance

### DFP Modelling Tempo

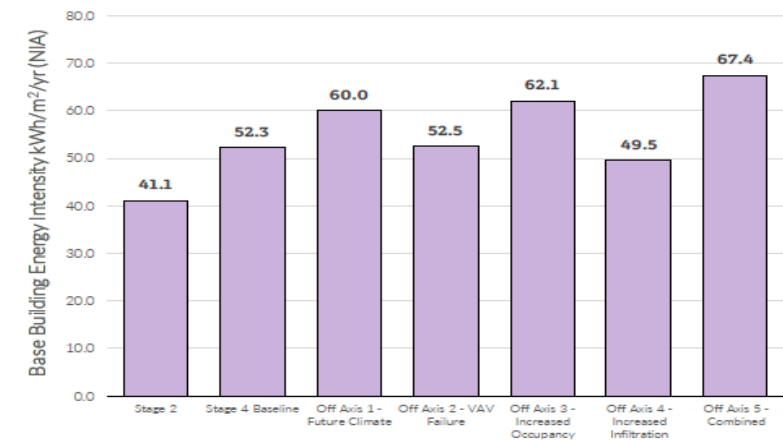
- Baseline target set at 130 kWh/m<sup>2</sup> GIA
- Tenants use of energy modelled
- Numerous “off axis” occupation scenarios
- Stage 4 design 105 kWh/m<sup>2</sup> GIA (whole building)
- Base Build Energy 48 kWh/m<sup>2</sup> GIA
- Tenant Energy 57 kWh/m<sup>2</sup> GIA

### NABERS predicted rating

- Slightly different basis of calculation
- 52.3 kWh/m<sup>2</sup> NIA – 5.5 ★
- Excludes impact of 590 m<sup>2</sup> of PV
- Rating granted on actual measurements 1 year after 75% let



Scope	Metric	Baseline Target	Stage 4	% improvement
Whole building energy	kWh <sub>e</sub> /m <sup>2</sup> (NIA) / year	160	142	11%
	kWh <sub>e</sub> /m <sup>2</sup> (GIA) / year	130	105	19%
Base building energy	kWh <sub>e</sub> /m <sup>2</sup> (NIA) / year	90	64	29%
	kWh <sub>e</sub> /m <sup>2</sup> (GIA) / year	70	48	31%
Tenant Energy	kWh <sub>e</sub> /m <sup>2</sup> (NIA) / year	70	78	-11%



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# Update on GRESB 2023 Real estate Standard

Erik Landry, GRESB

**IIGCC**  
The Institutional Investors  
Group on Climate Change





# GRESB Standards

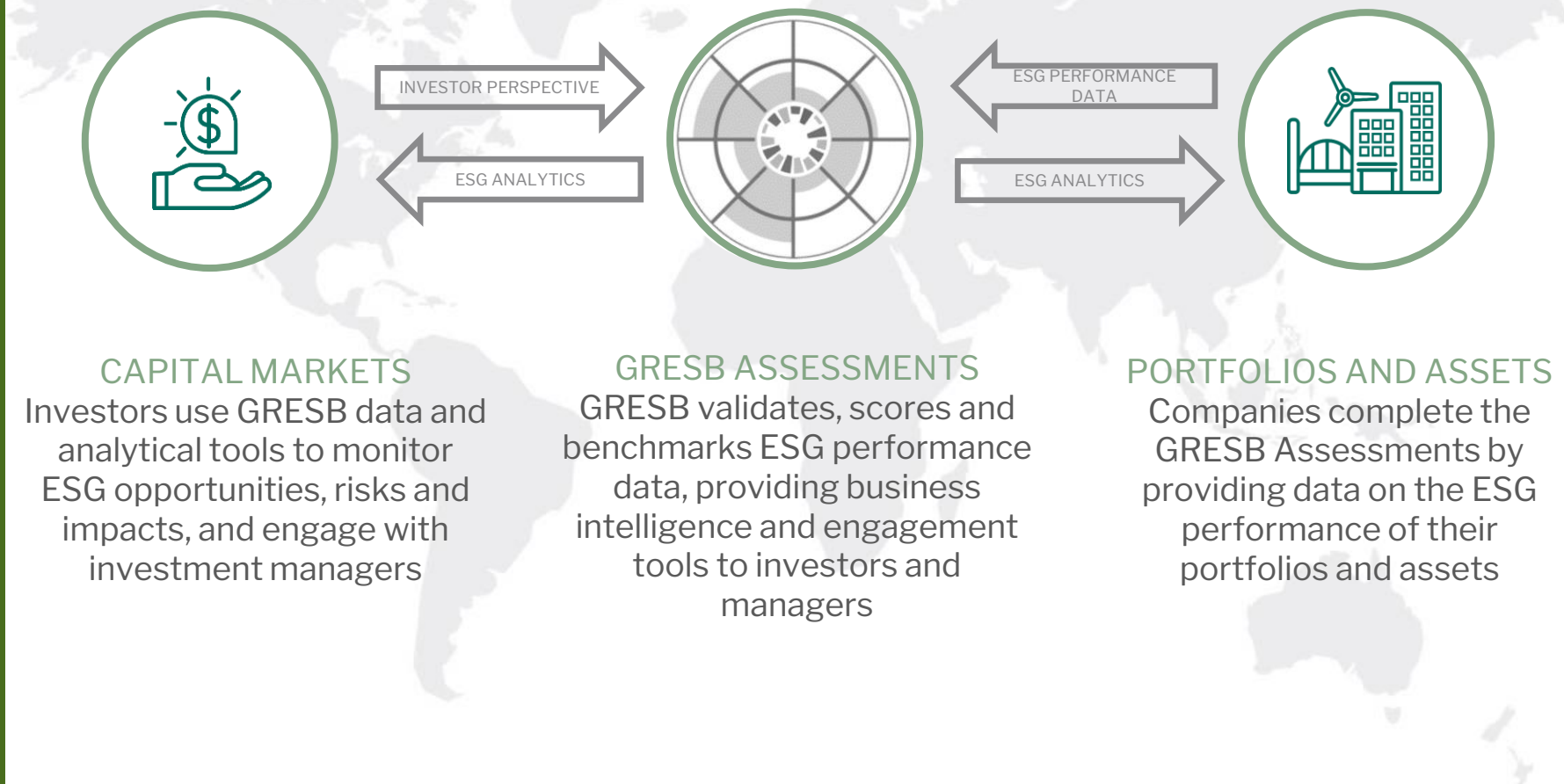
Embodied Carbon  
Measurement

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[gresb.com](https://www.gresb.com)

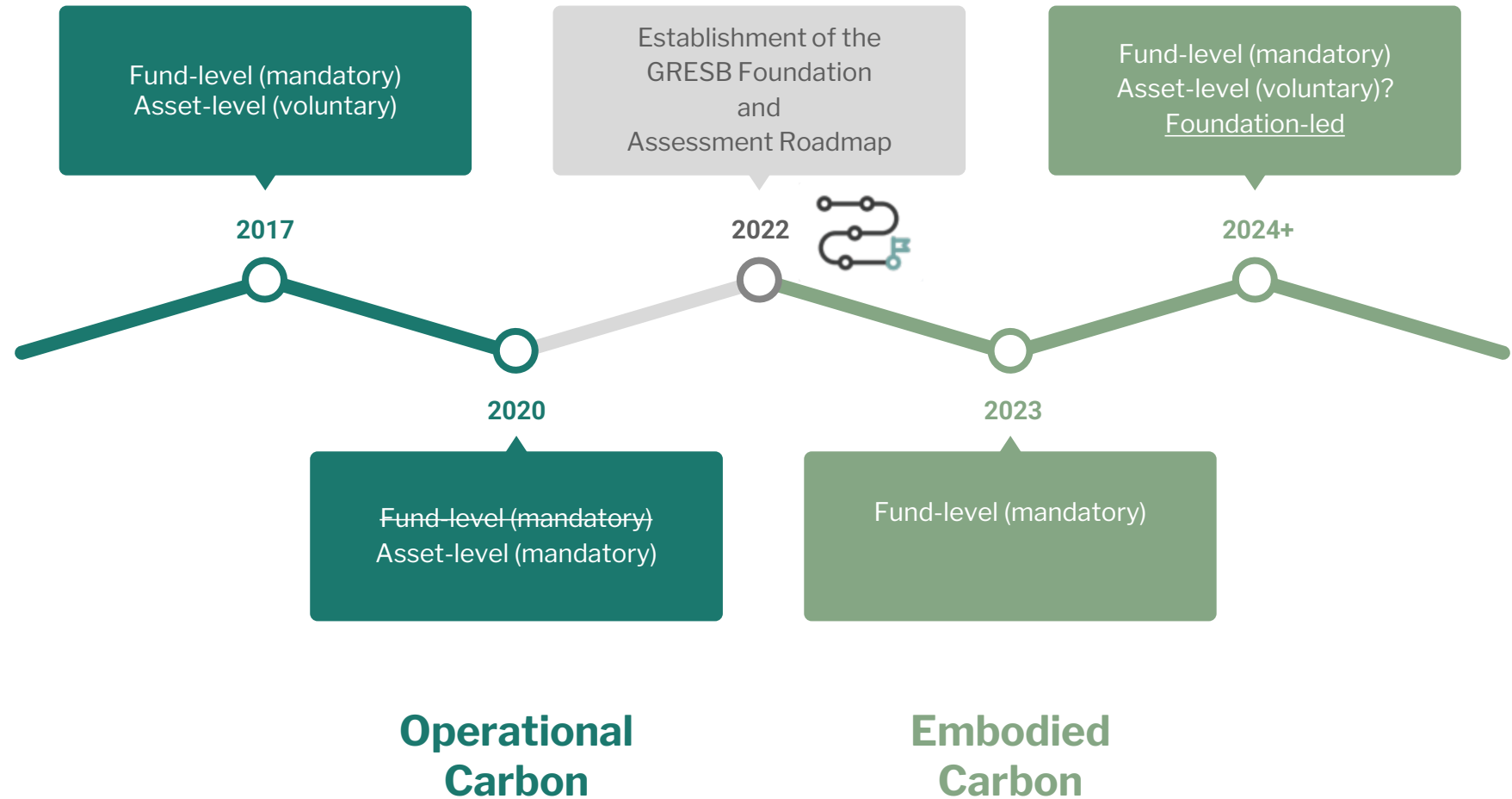
# GRESB - Who we are

The global ESG  
benchmark for real  
assets



# Evolution of the GRESB Real Estate Standard

Fund-level → Asset-level  
Voluntary → Mandatory



# GRESB Standards - Embodied carbon

Development Component -

Embodied carbon measurement indicator

## DMA2.2 Embodied carbon measurement

Does the entity measure the embodied carbon emissions of its development projects?

☐ Yes

Does the entity measure the embodied carbon of its new construction projects?

☐ Yes

Average embodied carbon intensity (kgCO<sub>2</sub>e/m<sup>2</sup>): \_\_\_\_\_

Total embodied carbon emissions (kgCO<sub>2</sub>e): \_\_\_\_\_

Select the life cycle stages included in scope:

- ☐ A1-A3 (Cradle to gate)
- ☐ A1-A3, A4 (Cradle to site)
- ☐ A1-A3, A4, A5 (Cradle to practical completion)
- ☐ Other: \_\_\_\_\_

Select the building layers included in the scope:

- ☐ Substructure
- ☐ Superstructure
- ☐ Finishes
- ☐ Fixed FF&E
- ☐ Building services (MEP)
- ☐ Furniture and appliances
- ☐ Other: \_\_\_\_\_

Percentage of new construction projects included: \_\_\_\_\_

☐ No



- Same is collected for Major Renovation projects
- GRESB is also collecting if this is publicly disclosed

# GRESB Standards - Embodied carbon

Alignment with different frameworks/Standards

## DMA2.2 Embodied carbon measurement

Does the entity measure the embodied carbon emissions of its development projects?

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☐ A1-A3, A4, A5 (Cradle to practical completion)

☐ Other: \_\_\_\_\_

Select the building layers included in the scope:

☐ Substructure

☐ Superstructure

☐ Finishes

☐ Fixed FF&E

☐ Building services (MEP)

☐ Furniture and appliances

☐ Other: \_\_\_\_\_

	BUILDING STAGES						BEYOND LIFE
	PRODUCT	CONSTRUCTION	USE		END OF LIFE	EMISSIONS	
	A1-A3	A4-A5	B1-B5	B6-B7	C	kgCO <sub>2</sub> /m <sup>2</sup>	D
<b>BUILDING LAYERS</b>							
<b>Structure</b> Foundation, load-bearing							
<b>Skin</b> Windows, roof, insulations							
<b>Space Plan</b> Interior finishes							
<b>Services</b> Mechanical, electrical, plumbing							
<b>Stuff (optional)</b> Furniture & appliances							
<b>Building carbon emissions</b>							
<b>Carbon compensation</b> Removals and offset							

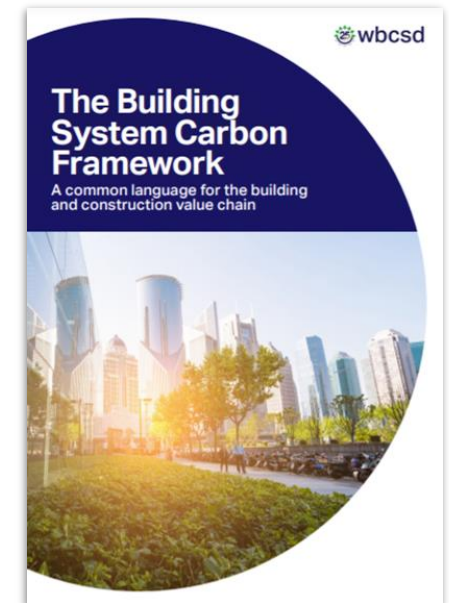
● Embodied carbon

● Operational carbon

● Partial and total sums

Percentage of new construction projects included: \_\_\_\_\_

☐ No



# GRESB Standards - Embodied carbon

Alignment with different frameworks/Standards

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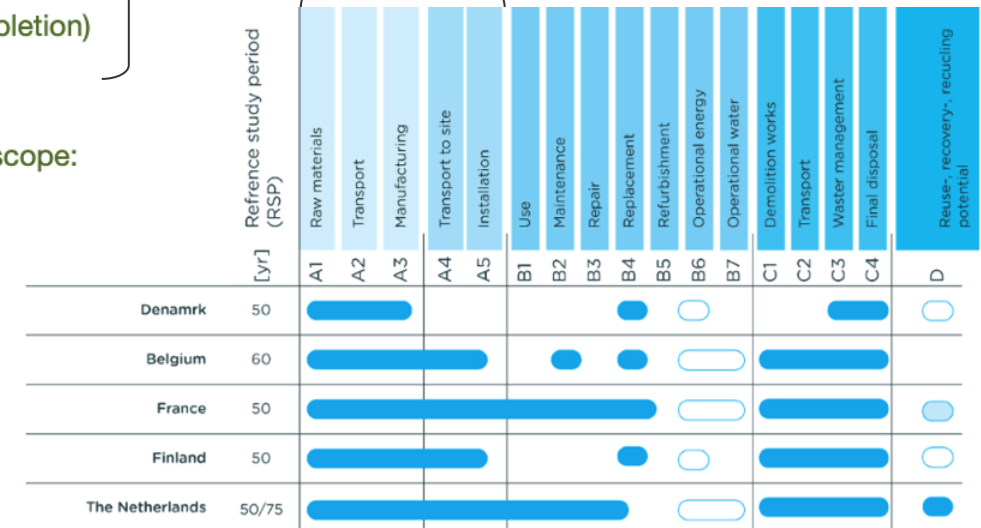
- ☐ A1-A3 (Cradle to gate)
- ☐ A1-A3, A4 (Cradle to site)
- ☐ A1-A3, A4, A5 (Cradle to practical completion)
- ☐ Other: \_\_\_\_\_

Select the building layers included in the scope:

- ☐ Substructure
- ☐ Superstructure
- ☐ Finishes
- ☐ Fixed FF&E
- ☐ Building services (MEP)
- ☐ Furniture and appliances
- ☐ Other: \_\_\_\_\_

Percentage of new construction projects included: \_\_\_\_\_

☐ No



# GRESB Standards - Embodied carbon

Alignment with different frameworks/Standards

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☐ A1-A3, A4 (Cradle to site)

☐ A1-A3, A4, A5 (Cradle to practical completion)

☐ Other: \_\_\_\_\_

Select the building layers included in the scope:

☐ Substructure

☐ Superstructure

☐ Finishes

☐ Fixed FF&E

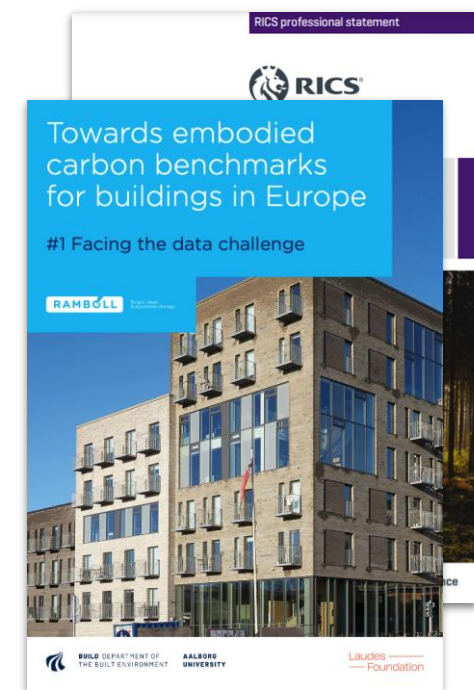
☐ Building services (MEP)

☐ Furniture and appliances

☐ Other: \_\_\_\_\_

Percentage of new construction projects included: \_\_\_\_\_

☐ No



Building elements included according to LCA standards											Details vary between schemes		
Building elements included according to LCA standards	Facilitating Works (excluding construction)	Substructure	Superstructure (Frame)	Superstructure (Roof and Floor)	Superstructure (External walls and Windows)	Superstructure (Internal walls and Partitions)	Internal Finishes	Building Services (MEP)	Fittings, Furnishings and Equipment	External Works	Details vary between schemes		
Denmark											Details vary between schemes		
Swedish Building Regulation 2023											Details vary between schemes		
Voluntary Sustainability Class											Details vary between schemes		
DGNB-DK											Details vary between schemes		
Finland											Details vary between schemes		
Climate Declaration											Details vary between schemes		
RTS											Details vary between schemes		
Sweden											Details vary between schemes		
Hjältebyggnad 3.0-3.1											Details vary between schemes		
Hjältebyggnad 3.2											Details vary between schemes		
Hjältebyggnad 4.0											Details vary between schemes		
Klimatdeklaration 2022											Details vary between schemes		
Klimatdeklaration 2027											Details vary between schemes		
BREEAM SE 2017											Details vary between schemes		
NBSCO2											Details vary between schemes		
Europe											Details vary between schemes		
Levels 2020											Details vary between schemes		
Norway											Details vary between schemes		
TEK17											Details vary between schemes		
BREEAM-NOR 2016											Details vary between schemes		
BREEAM-NOR v6.0											Details vary between schemes		
Futurebuilt Zero											Details vary between schemes		
UK											Details vary between schemes		
BREEAM NC 2016											Details vary between schemes		
RICS											Details vary between schemes		
London Plan WLCA 2022											Details vary between schemes		
International											Details vary between schemes		
BREEAM International New construction V6											Details vary between schemes		
LEED V4.1											Details vary between schemes		

Required Optional To be defined 1. Included only if part of the horizontal structure 2. Not included in assessment of GHG reduction 3. Solar panel installations are mandatory to include



GRESB  
REAL ESTATE

# Panel discussion

Moderated by Peter Sweatman, Climate Strategy and Partners

- Aleksandra Njagulj, DWS
- Luca de Giovanetti, WBCSD
- Adam Smith, BBP
- Shuen Chan, LGIM Real Assets
- Xavier Le Den, Ramboll
- Erik Landry, GRESB



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# Thank you

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