

Net Zero Built Environment

Luca De Giovanetti,
World Business Council for Sustainable Development (WBCSD)

Virtual WEC Executive Roundtable September 8-9, 2021



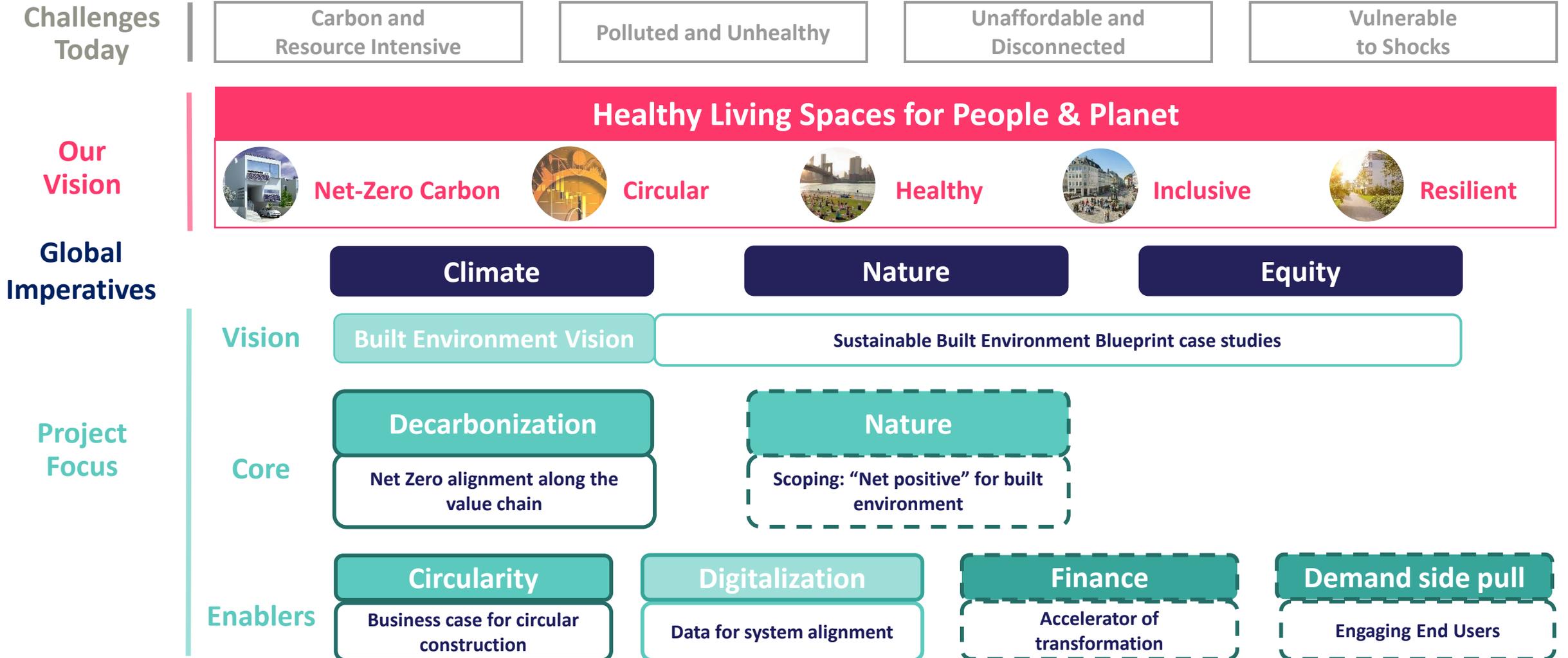
WBCSD – Business leadership for a sustainable future



200 global companies united around a common vision creating a world in which over 9 billion people are all living well and within planetary boundaries by 2050

Our Vision & Scope:

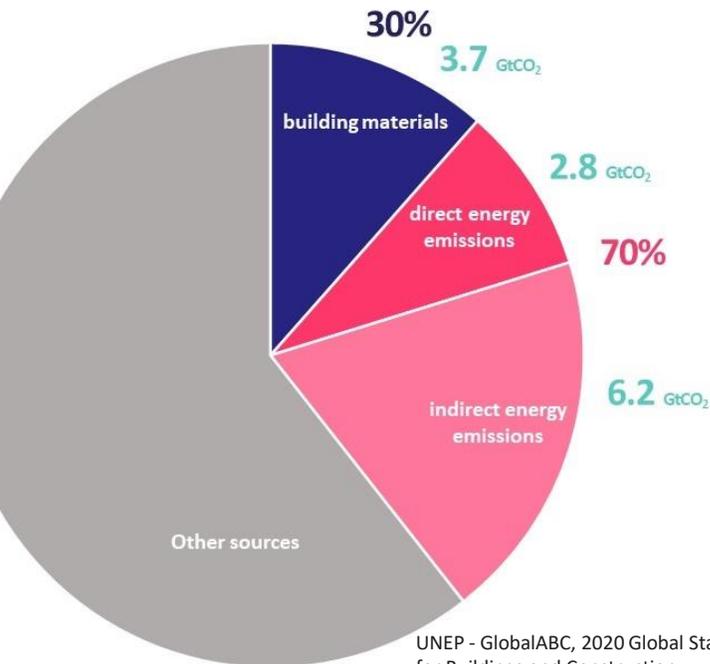
Built environment as a connected system in the urban context



Built environment decarbonization

Accelerating the achievement of *net-zero emissions* across the *entire built environment lifecycle* through *system-wide collaboration*.

Problem



UNEP - GlobalABC, 2020 Global Status Report for Buildings and Construction

~40% global energy-related CO₂ emissions = 13 GtCO₂



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

Vision

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

Embodied carbon:

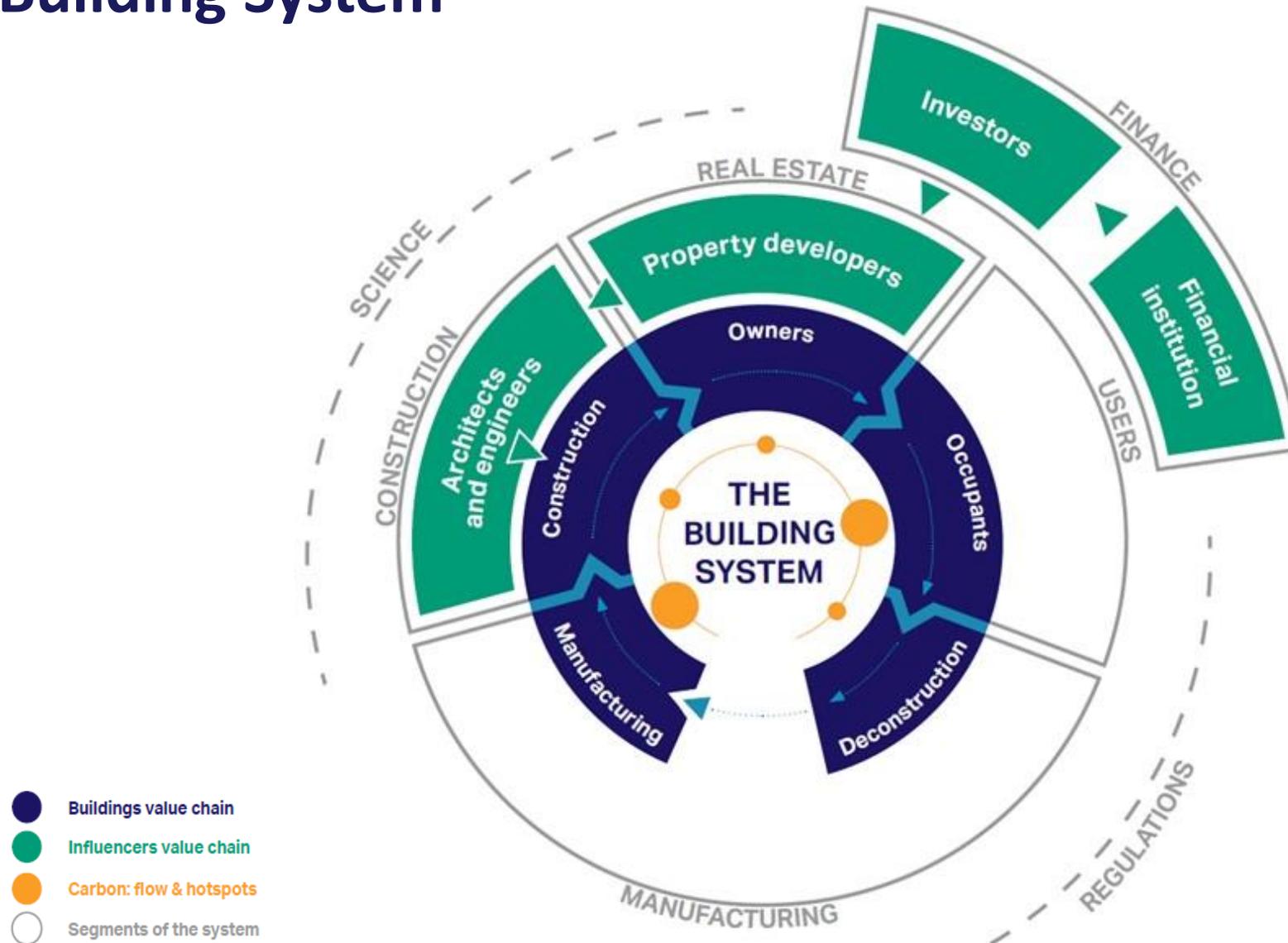
- 2030: -40% CO₂ emissions
- 2050: Net Zero

Operation - Net Zero :

- 2030: all new buildings
- 2050: all buildings

UNFCCC - Climate Action Pathway - Human Settlements, 2021

The Building System



www.wbcSD.org/building-system-carbon-framework

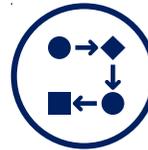
Decarbonization workstream: Overview



Solutions



1) Common narrative: Enable a common language and vision for the system.



2) System value chain action: support companies to implement the carbon mitigation action required to achieve the climate targets.



3) Market transformation: multi-stakeholder engagement to enable conducive policy and business environment.

Decarbonization workstream: Overview



Solutions



1) Common narrative: Enable a common language and vision for the system.

2) System value chain action: support companies to implement the carbon mitigation action required to achieve the climate targets.

3) Market transformation: multi-stakeholder engagement to enable conducive policy and business environment.

How we partner to increase impact

Science / Target setting / Pathways



National governments



Common vision
Roadmaps
Market transformation dialogue

Other



Business



Net Zero

ConcreteZero



North America focus

Demand Hub

Investors



Cities



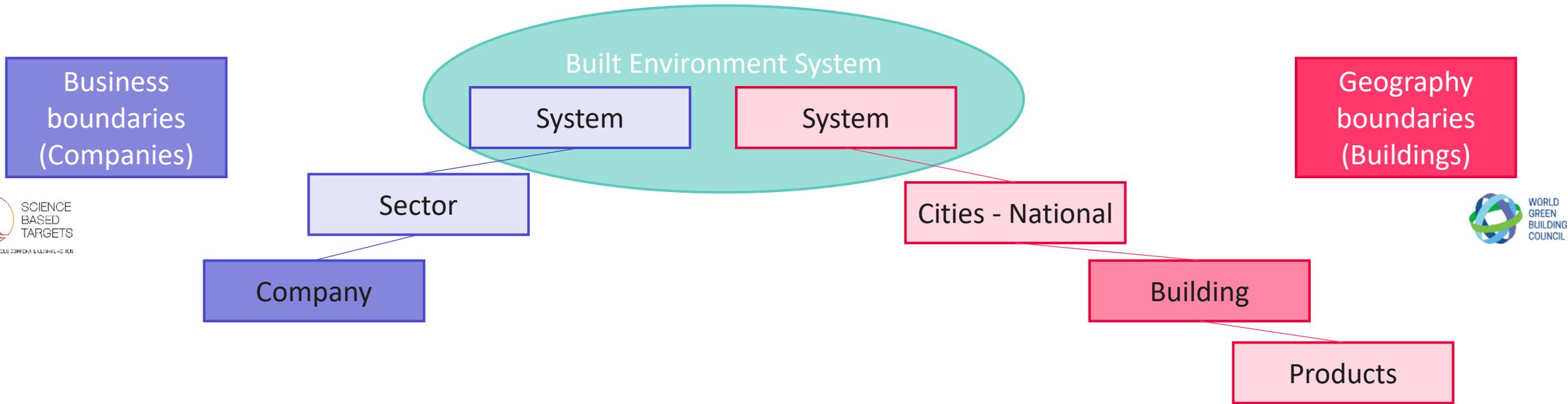
Clean Construction Forum

Embodied carbon policies

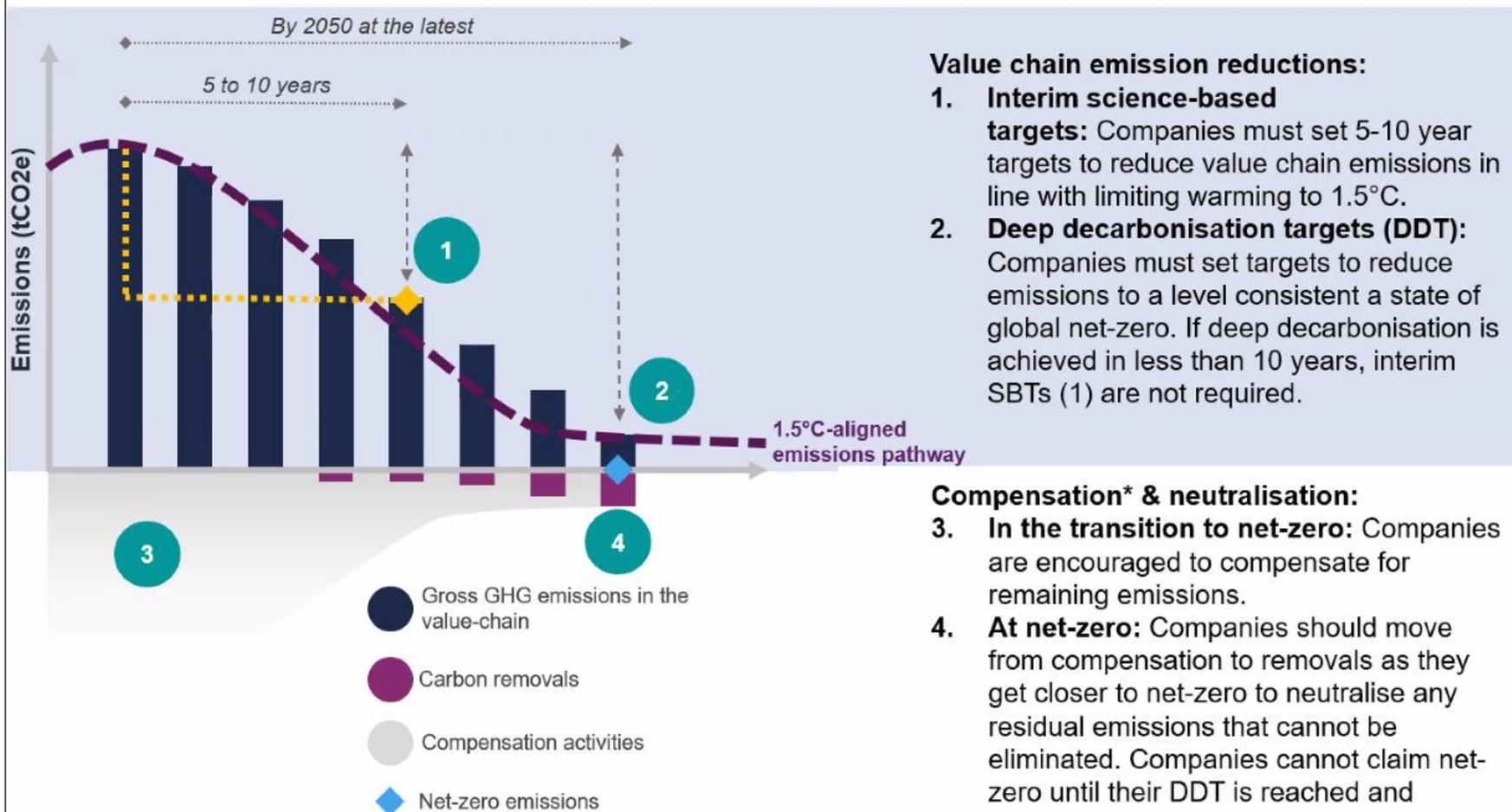
Cty-business collaboration

Net Zero Built Environment Alignment: Principles

Common narrative for a Net Zero Built Environment, aligning Net Zero definition for business and buildings.



What are the key elements that make up a company's SBTi aligned net-zero commitment?



Value chain emission reductions:

- Interim science-based targets:** Companies must set 5-10 year targets to reduce value chain emissions in line with limiting warming to 1.5°C.
- Deep decarbonisation targets (DDT):** Companies must set targets to reduce emissions to a level consistent a state of global net-zero. If deep decarbonisation is achieved in less than 10 years, interim SBTs (1) are not required.

Science-based emission reduction targets

Compensation* & neutralisation:

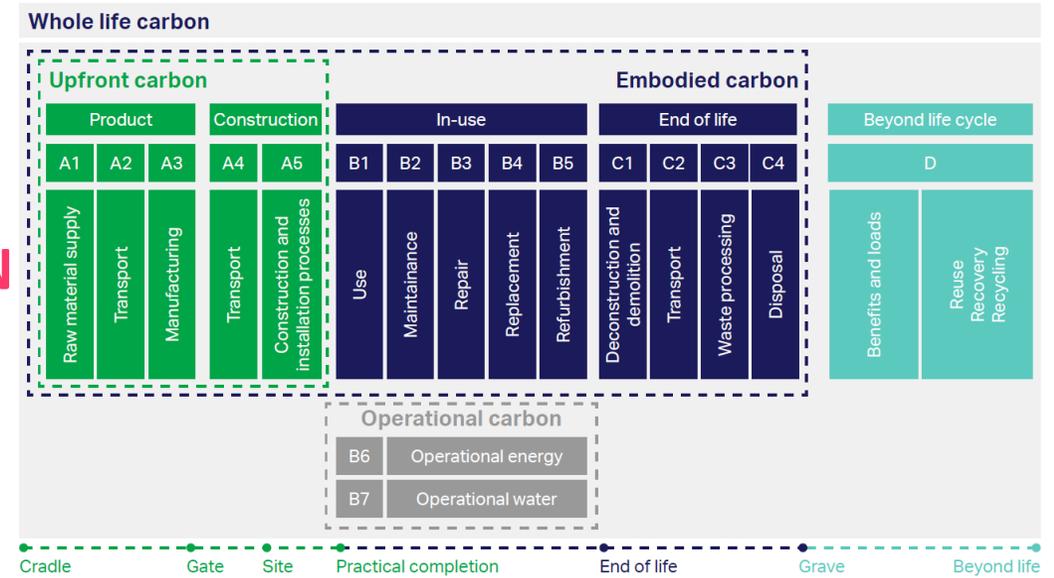
- In the transition to net-zero:** Companies are encouraged to compensate for remaining emissions.
- At net-zero:** Companies should move from compensation to removals as they get closer to net-zero to neutralise any residual emissions that cannot be eliminated. Companies cannot claim net-zero until their DDT is reached and residual emissions are neutralised.

Net-zero commitment

* The term compensation is currently under review and is being used as a placeholder

The Building System Carbon Framework

Figure 7: Whole life cycle stages, EN15978 (2011)¹⁰



WHEN

WHERE

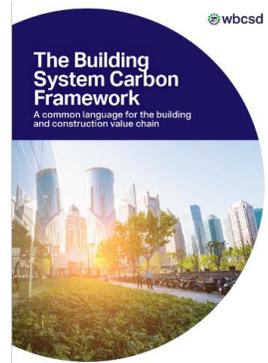
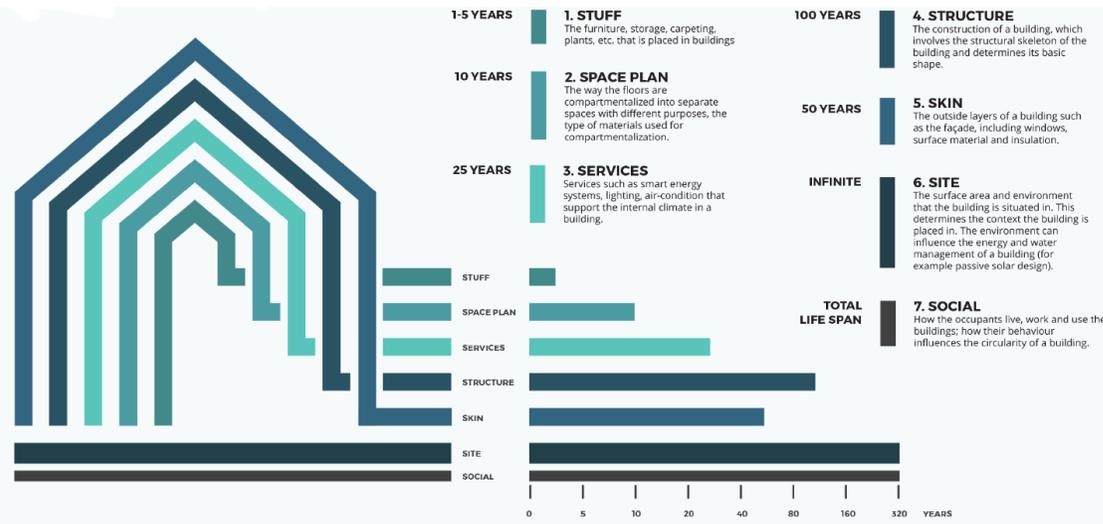


Figure 5: Building model consisting of the building related layers based on the sharing layers⁹



		BUILDING STAGES					
		PRODUCT	CONSTRUCTION	USE	END OF LIFE	EMISSIONS	BEYOND LIFE
		A1-A3	A4-A5	B1-B5	B6-B7	C	kgCO ₂ /m ²
BUILDING LAYERS	Structure						
	Skin						
	Space Plan						
	Services						
	Stuff (optional)						
	Building carbon emissions						
	Carbon compensation						
	Removals and offset						

The Building System Carbon Framework

		BUILDING STAGES <small>(EN15978:2011)</small>						
		PRODUCT	CONSTRUCTION	USE		END OF LIFE	EMISSIONS	BEYOND LIFE
		A1-A3	A4-A5	B1-B5	B6-B7	C	kgCO ₂ /m ²	D
BUILDING LAYERS	Structure Foundation, load-bearing							
	Skin Windows, roof, insulations							
	Space Plan Interior finishes							
	Services Mechanical, electrical, plumbing							
	Stuff (optional) Furniture & appliances							
	Building carbon emissions							
	Carbon compensation Removals and offset							

● Embodied carbon

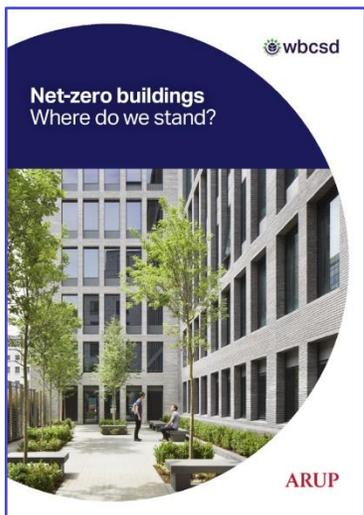
● Operational carbon

● Partial and total sums

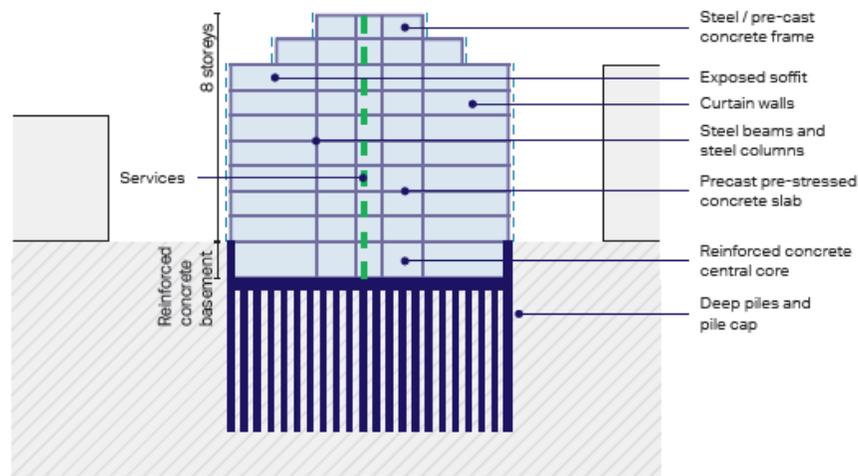
www.wbcscd.org/building-system-carbon-framework

All electric office building, London, UK

Case study 02



Download here:
<https://bit.ly/3AOicU7>



TYPE
Office, New build

LOCATION
London, UK

DEVELOPMENT STAGE
Building's handover

GIA
40,065 m²

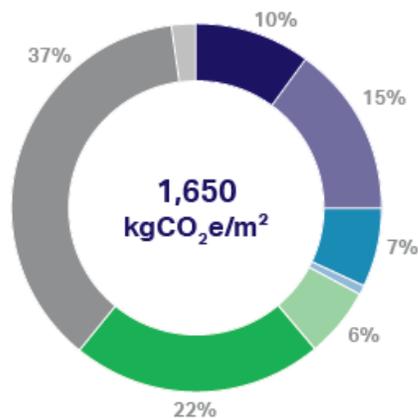
RATING SCHEME
LEED 2014 Gold
BREEAM 2014 Excellent
Ecohomes Excellent

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/m²/year

Figure 17: Whole life carbon (A-C)



Main results

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

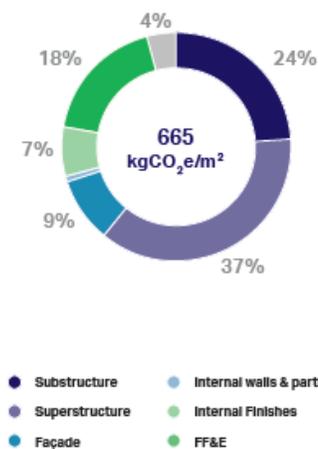
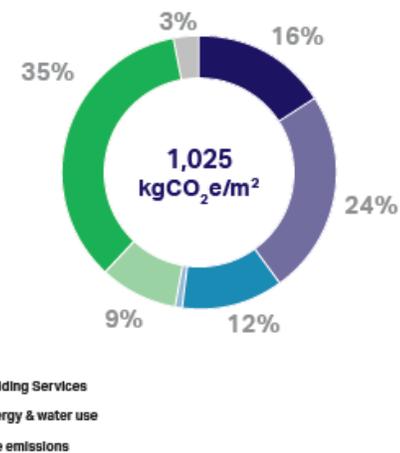


Figure 19: Embodied Carbon over the Life Cycle (A-C)



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

Case Study 02		Building Stages						
Whole life carbon emissions kgCO ₂ e/m ²	Product	Construction	Use		End of life	A-C Emissions	Beyond Life	
	A1-A3	A4-A5	B1-B5	B6-B7	C		D	
Building layers	Substructure – RICS Level 1 <i>Foundations, lowest floor construction, retaining walls</i>	152	7	0		3.2	162	-14.9
	Structure – RICS Level 2.1 – 2.4 <i>Frame, floors, roofs and stairs</i>	240	4	0		1.8	246	-92.2
	Skin/Façade – RICS Level 2.5 – 2.6 <i>External walls, windows and doors</i>	59	1	59		0.6	120	-33.1
	Space Plan – RICS Level 2.7 – 2.8 <i>Internal walls, partitions and doors</i>	6	0	6		0.2	13	-1.7
	Space Plan – RICS Level 3 <i>Internal finishes</i>	45	1	46		0.7	94	-5.7
	Stuff – RICS Level 4 <i>Fittings, furnishings and equipment</i>	0	0	0		0.0	0	0
	Services – RICS Level 5 <i>Building services</i>	120	1	240	619	1.3	981	-60
	Site emissions (A5) <i>Waste, electricity and fuel</i>		30				30	
Embodied carbon emissions	623	44	352		8	1,027	-208	
Operational carbon emissions Energy and water use				619		619		
Building carbon emissions	623	44	352	619	8	1,647	-208	

Key figures - whole life carbon A-C

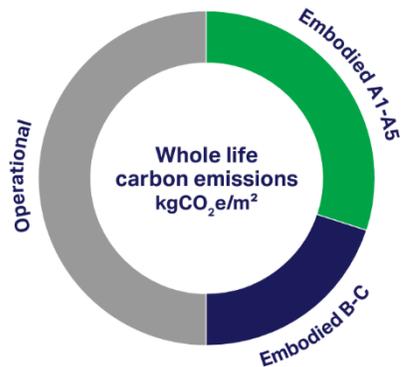


Figure 41: Whole life carbon (A-C) average across all six case studies

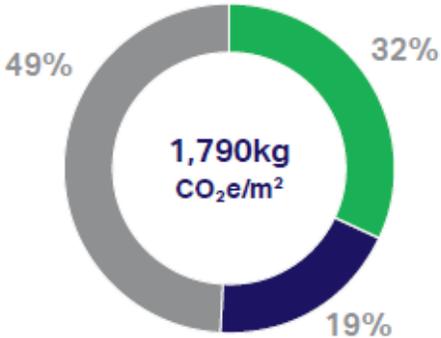
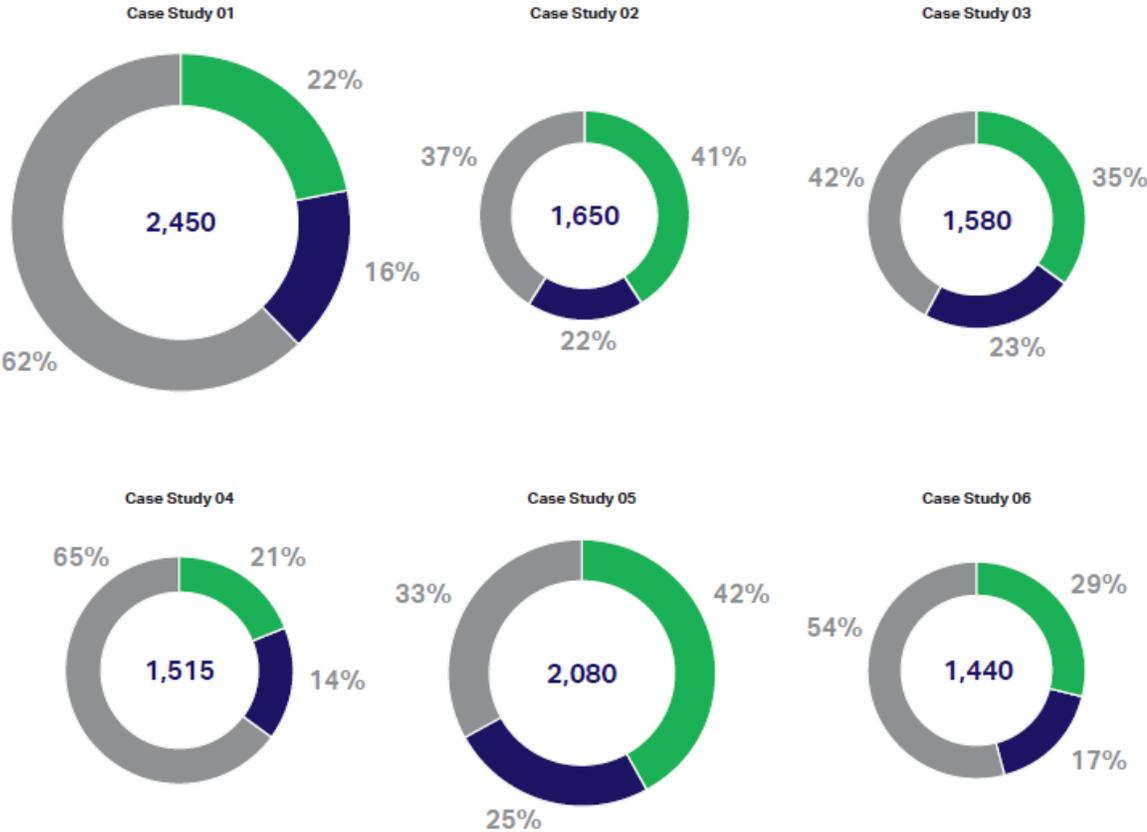
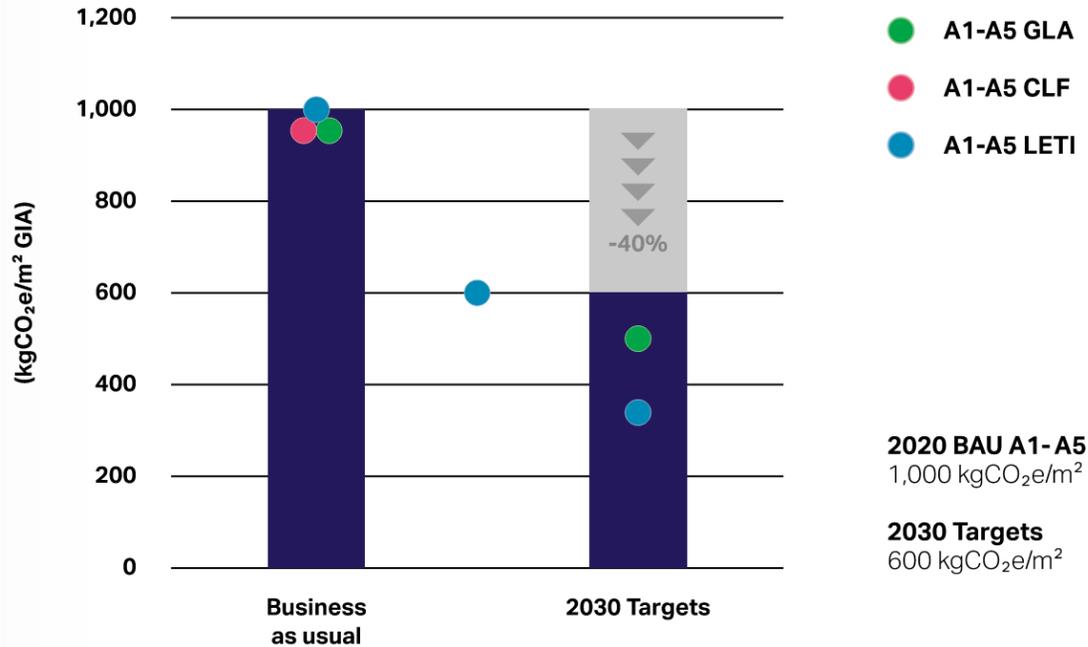


Figure 39: Case studies results



Emerging benchmarks and targets

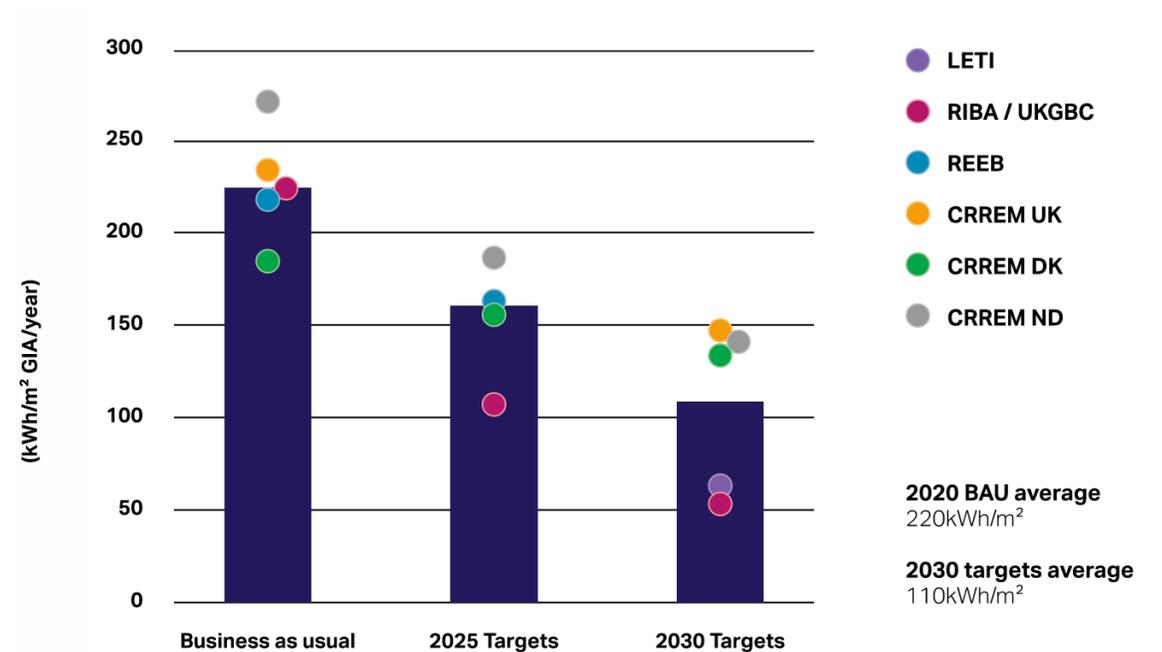
- Upfront embodied carbon targets



Challenge: could a 2030 target for all project be:

- **≤400 kgCO₂e/m² (A1-A5)**
- **0 kgCO₂e/m² (B1-C4)**

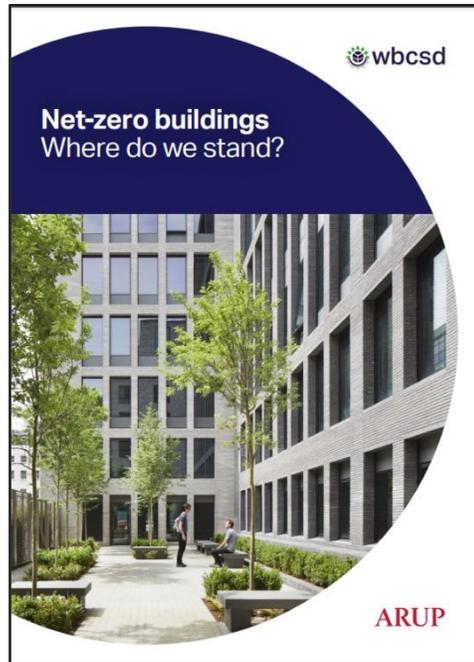
- Energy use intensity targets



Challenge: could a 2030 target for all project be: 50kWh/m²

Are targets aligned with national grid decarbonization trajectories?

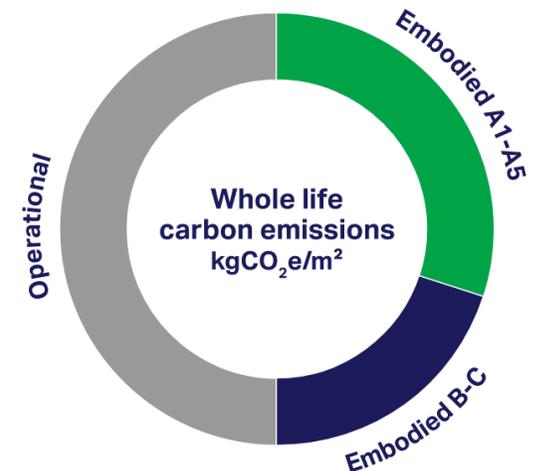
“Net Zero Buildings – where do we stand?”



Download here:
<https://bit.ly/3AOicU7>

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 whole life carbon assessment and publish results using the building system carbon framework to create body of evidence and foster shared learning

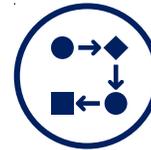
Decarbonization workstream: Overview



Solutions



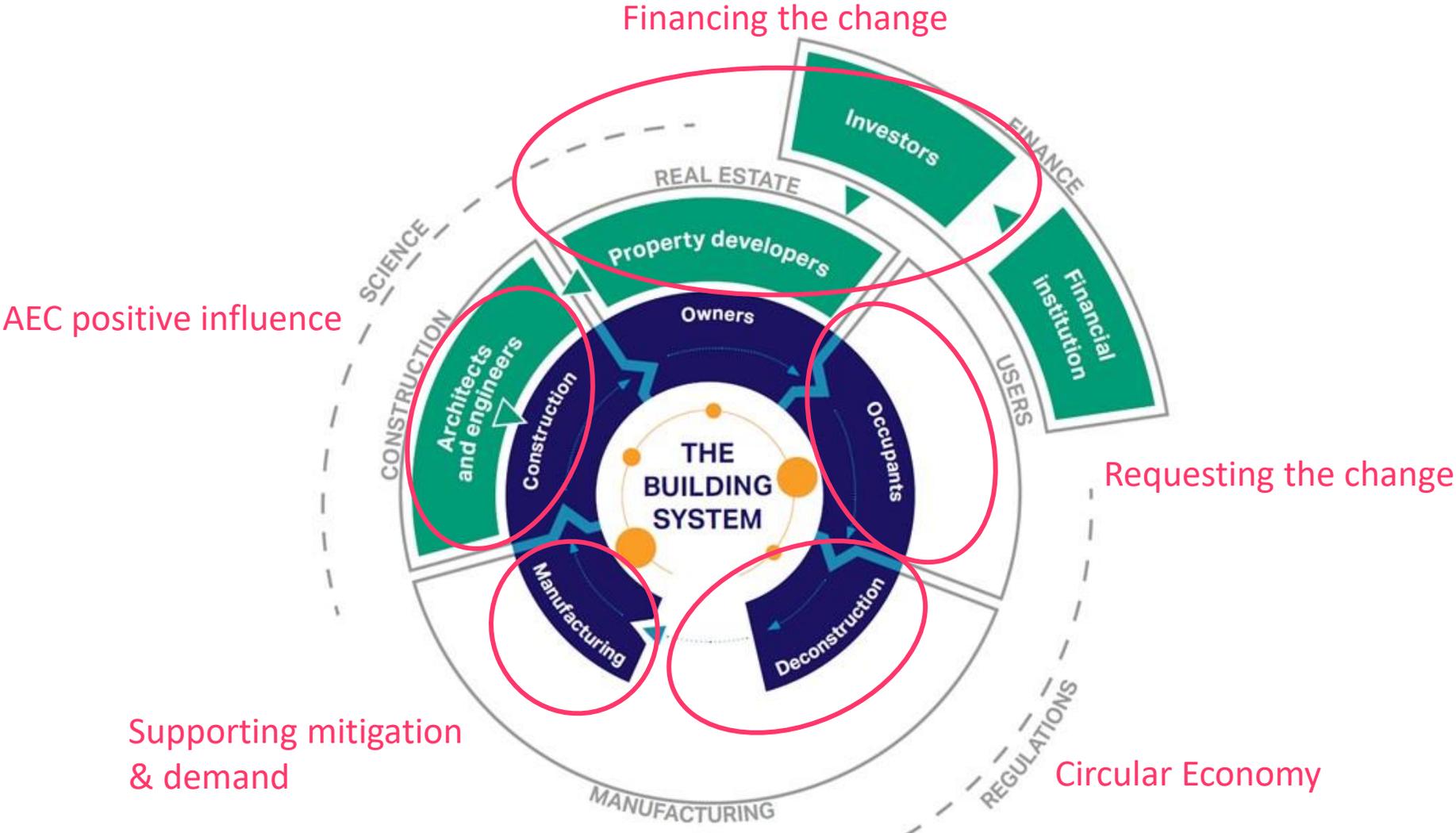
1) **Common narrative:** Enable a common language and vision for the system.



2) **System value chain action:** support companies to implement the carbon mitigation action required to achieve the climate targets.

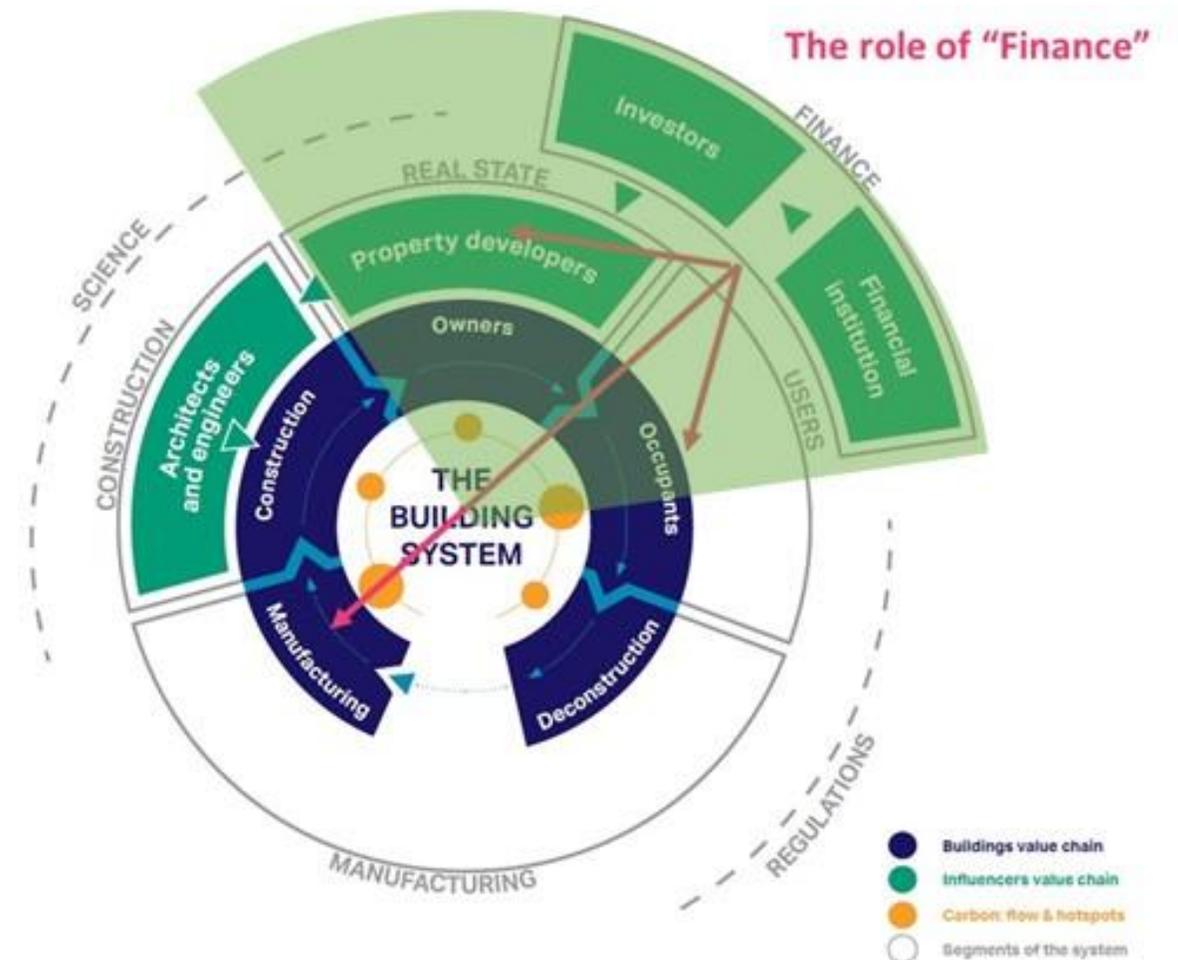
3) **Market transformation:** multi-stakeholder engagement to enable conducive policy and business environment.

Solutions for the system



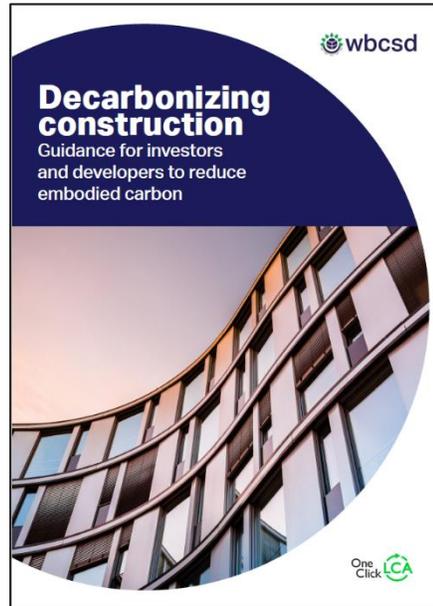
Role of the financial sector

- **Institutional investors:** set requirements for the real estate, debt and equity investment portfolios, in line with Paris Agreement compatible emissions trajectories
- **Asset managers:** support the investors in setting and executing their strategies
- **Lenders:** can link carbon performance to their loans and provide incentives
- **Property developers:** consider carbon performance requirements and/or circular solutions as part of the procurement process for their projects
- All these firms occupy and / or manage real estate themselves and can develop policies for low-carbon performance in their role as tenants (WBCSD is setting up a Corporate Real Estate Directors network)



Decarbonizing Construction

Guidance for investors and developers to reduce embodied carbon



Download here:

<https://bit.ly/2Vg0Hvk>

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

Note: Cities are also at times playing some of these roles.

Finance Insight on [“Decarbonizing the 40%”](#)

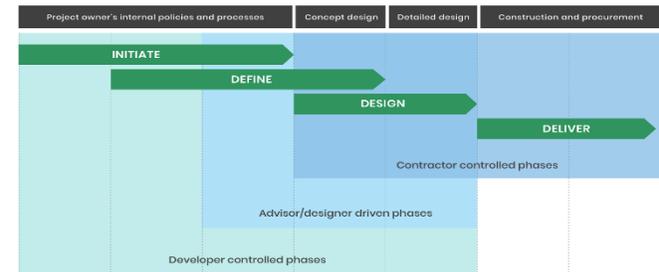
What does it do?

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

Four project phases:



Decarbonization workstream: Overview



Solutions



1) **Common narrative:** Enable a common language and vision for the system.

2) **System value chain action:** support companies to implement the carbon mitigation action required to achieve the climate targets.



3) **Market transformation:** multi-stakeholder engagement to enable conducive policy and business environment.

Global Alliance for Building and Construction



www.globalabc.org

About the GlobalABC

The GlobalABC is a voluntary, international, multi-stakeholder partnership, launched at COP21 in Paris. Its Secretariat is hosted by UN Environment.

Aim: To mobilize all stakeholders to scale up climate actions in the sector.

GlobalABC activities are organized around **five** different work areas:

1. Education and Awareness
2. Public Policies
3. **Market Transformation** (incl: SBT4buildings)
4. Finance
5. Building Measurement, Data and Information

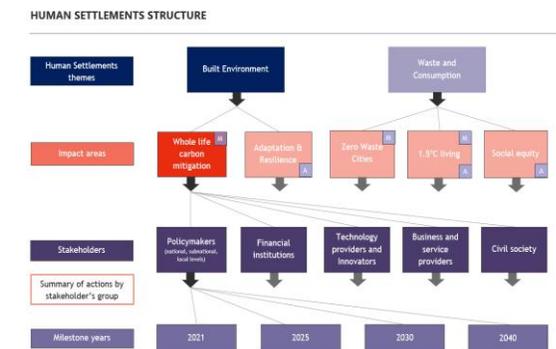
WBCSD is co-chair of the steering committee and of the work area 3.

Conducive market and policy environment

Provide an opportunity to companies to shape the **dialogue** with national and sub-national policy makers about the **enabling framework for private sector action**.



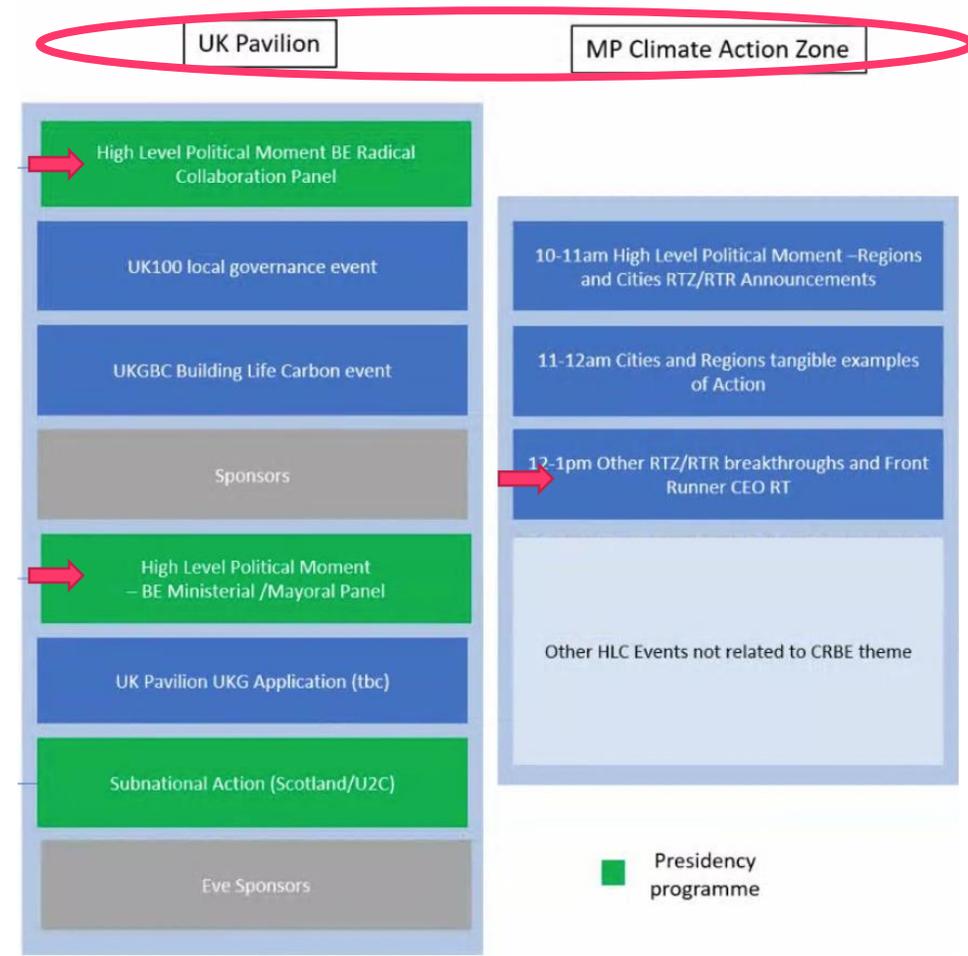
Download [link](#)



COP26 – CRBE day 11 November



WEEK ONE						
SUNDAY OCTOBER 31ST	MONDAY NOVEMBER 1ST	TUESDAY NOVEMBER 2ND	WEDNESDAY NOVEMBER 3RD	THURSDAY NOVEMBER 4TH	FRIDAY NOVEMBER 5TH	SATURDAY NOVEMBER 6TH
PROCEDURAL OPENING OF NEGOTIATIONS	WORLD LEADERS SUMMIT Welcoming world leaders to COP to put forward high level ambition and action towards securing global net zero and keeping 1.5 degrees in reach; adapting to protect communities and natural habitats; and mobilising finance.		FINANCE Mobilising public and private finance flows at scale for mitigation and adaptation.	ENERGY Accelerating the global transition to clean energy.	YOUTH AND PUBLIC EMPOWERMENT Elevating the voice of young people and demonstrating the critical role of public empowerment and education in climate action.	NATURE Ensuring the importance of nature and sustainable land use are part of global action on climate change and a clean, green recovery.
WEEK TWO						
SUNDAY NOVEMBER 7TH	MONDAY NOVEMBER 8TH	TUESDAY NOVEMBER 9TH	WEDNESDAY NOVEMBER 10TH	THURSDAY NOVEMBER 11TH	FRIDAY NOVEMBER 12TH	SATURDAY NOVEMBER 13TH
REST DAY AHEAD OF THE SECOND WEEK OF NEGOTIATIONS	ADAPTATION, LOSS AND DAMAGE Delivering the practical solutions needed to adapt to climate impacts and address loss and damage.	GENDER Progressing gender equality and the full and meaningful participation of women and girls in climate action. SCIENCE AND INNOVATION Demonstrating that science and innovation can deliver climate solutions to meet, and accelerate, increased ambition.	TRANSPORT Driving the global transition to zero emission transport.	CITIES, REGIONS & BUILT ENVIRONMENT Advancing action in the places we live, from communities, through to cities and regions.	CLOSURE OF NEGOTIATIONS	



Success framework for Built Environment at COP26

<p>CRITICAL SECTOR: Established built environment as critical for climate action and to BuildBackBetter. Cities & regions recognized as critical policy enablers and market demand drivers</p>	<p>40% of energy-related carbon emissions</p>
<p>ONE VOICE, ONE AMBITION: Built environment community rallied around overall goal and key transformative measures & asks for policymakers, finance, and business</p>	<p>reduce by > 50% by 2030, net zero by 2050</p>
<p>ALL ENGAGED & COMMITTED: Critical mass of cities, regions, national governments, and private sector actors committed to joint overall goal and measures based on their situation</p>	<p>Race to Zero</p>
<p>ACTION, SOLUTIONS, PATHWAYS: Demonstrated best practices, solutions that are being achieved now. Pathways to attain overall goal; and showcased those who implement them.</p>	<p>set targets</p>
<p>RADICAL COLLABORATION: Demonstrated stakeholder willingness to radically collaborate, across all stakeholders, from investment & ownership to design, construction & operation.</p>	<p>full value chain & demand side</p>

Achieve reduction of all built environment related carbon emissions across the whole lifecycle: 50% of overall reduction by 2030 & Net-zero emissions by 2050

Market Transformation for Net Zero Built Environment

Key Element

VISION

Common vision and north star

Mitigation ACTIONS

Decarbonization actions reducing carbon emissions

Market Transformation “Manifesto”

ASKS
(Policy, Finance, Business, Science)

What P, F, B, S need to do to contribute the achievement of the transformation measures

Key TRANSFORMATION

Key and essential transformational levers enabling and accelerating the decarbonization's action. What is needed so that decarbonization actions can happen

2030: -50%

2050: Net Zero

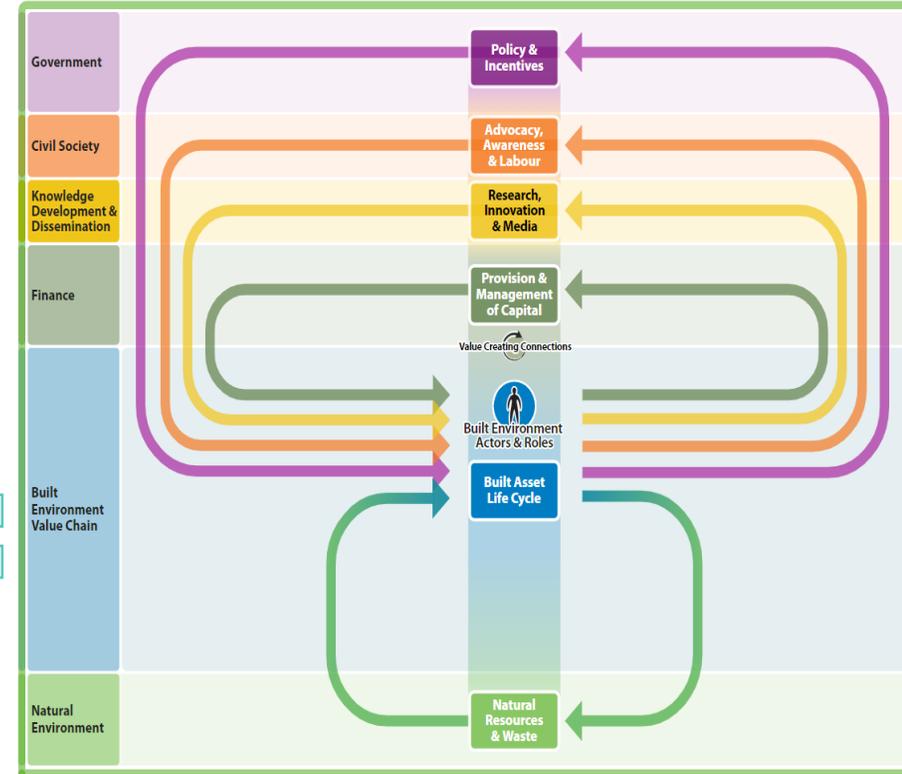
Whole life carbon mitigation (#40% CO₂)

Climate Action Pathways

Global Regional Roadmap

1-2 key asks per group per lever

3-5 key levers



Global Alliance for Buildings and Construction



GlobalABC: Work Area 3 - Market Transformation



WORLD GREEN BUILDING COUNCIL



VISION 2050

**WBCSD'S VISION FOR 2050 IS A WORLD IN WHICH
9+ BILLION PEOPLE LIVE WELL, WITHIN PLANETARY BOUNDARIES**

**TIME TO
TRANSFORM**

More than 9 billion people will be able live well, within planetary boundaries, by 2050 – but we must act now. We are facing unprecedented challenges: a climate emergency, nature in a state of crisis, and mounting inequality and social unrest. Key tipping points are being reached. Business, government, and civil society must change the systems that have created the challenges we now face – and change them so profoundly that we can legitimately call it transformation. The next decade represents a final window of opportunity to correct our course.

VISION 2050 IS STILL WITHIN REACH, BUT **WE HAVE TO TRANSFORM NOW.** FUTURE BUSINESS SUCCESS DEPENDS ON IT.

CLIMATE EMERGENCY

Time is running out to address the climate emergency. Increasingly frequent and devastating extreme weather events are already impacting communities today. We have eight years left to halve emissions for global warming to be kept to a maximum of 1.5°C, beyond which even half a degree will significantly worsen the risks of drought, floods, extreme heat and poverty for hundreds of millions of people.

NATURE IN CRISIS

Ongoing biodiversity loss will have grave consequences for our livelihoods, economies, health and security. Over half the world's total GDP – USD 44 trillion – is moderately or highly dependent on nature and its services, and exposed to risks from nature loss. Global wildlife populations shrank by 68% between 1970 and 2016, and we are currently on course to lose nearly one million species to extinction by 2050.

MOUNTING INEQUALITY

In 2020, inequality rose in every country. Many people are losing faith in our systems' ability to deliver a prosperous future for them and their children. Trust in institutions is eroding and both business and democracy itself face a significant threat to their license to operate. COVID-19 has brought inequality further into the spotlight, feeding on it, fueling it, and making it impossible to ignore.

To help business focus its efforts, *VISION 2050: TIME TO TRANSFORM* identifies

NINE TRANSFORMATION PATHWAYS

across the key areas of business activity that are essential to society

ENERGY

A sustainable energy system providing reliable and affordable net-zero carbon energy for all.

TRANSPORTATION & MOBILITY

Safe, accessible, clean and efficient transportation of people and goods.

LIVING SPACES

Healthy and inclusive living spaces, thriving in harmony with nature.

PRODUCTS & MATERIALS

Resource use is optimized to meet society's needs while allowing the systems that provide resources to regenerate.

FINANCIAL PRODUCTS & SERVICES

All financial capital and financial products and services are mobilized to support sustainable development.

CONNECTIVITY

Responsible connectivity brings people together, enhances transparency and efficiency, and drives access to opportunity.

HEALTH & WELLBEING

The highest attainable standard of health and wellbeing for everyone.

WATER & SANITATION

Thriving aquatic ecosystems that support food, energy and public health for all.

FOOD

A regenerative and equitable food system producing healthy, safe and nutritious food for all.

LIVING SPACES pathway

OUR 2050 VISION



LIVING SPACES

Healthy and inclusive living spaces, thriving in harmony with nature.

KEY TRANSITIONS

- › Building and infrastructure design shifts to focus on users' health
- › Infrastructure and buildings increasingly integrate and respect biodiversity
- › Cities and buildings pave the way towards net zero carbon
- › The emergence of resilient urban and rural communities
- › A shift towards 'circular cities' that minimize consumption and waste
- › Cities are made to work for all
- › Respect for human rights is embedded across the construction and materials sectors globally

ACTION AREAS FOR BUSINESS 2020-2030

- 1 Implement short-, medium- and long-term science-based targets to reduce the whole life carbon footprint of built structures toward net-zero emissions.** Collaborate with clients, suppliers and all actors across the built environment to ensure targets are met and to drive net-zero construction and renovation measures
- 2 Contribute to the development of national and sectoral decarbonization roadmaps,** and engage with authorities at the regional, national, and local levels to advocate for the targets, building codes, and planning, permitting, and procurement processes needed for a sustainable built environment.
- 3 Unlock the potential of digitalization** to facilitate data recording and transfer among stakeholders and across life-cycle stages to promote more holistic urban planning, greater transparency, and enhanced efficiency across the built environment sector.
- 4 Create ways for occupants to play a role** in minimizing the environmental impacts of their living and working spaces.
- 5 Develop circular business models to maintain the value of materials and resources** throughout the lifetime of built structures. Innovate to make circular options more cost-competitive, convenient, and dependable.
- 6 Future-proof buildings and infrastructure** to withstand environmental, social, and health-related shocks through urban planning, performance standards, and construction practices.
- 7 Develop and adopt science-based targets for nature,** which factor in impacts from material extraction to construction to building end-use. Integrate nature-based solutions into design and construction efforts.
- 8 Innovate and collaborate on new techniques and models to ensure the delivery of quality affordable housing that promotes health and wellbeing,** in both existing and new developments.
- 9 Conduct and enhance due diligence in line with the UN Guiding Principle on Business and Human Rights** with a view to respecting human rights and ensuring decent working conditions throughout the construction value chain, including in the informal economy.
- 10 Develop comprehensive strategies to support a just transition for workers that may be affected by emerging construction methods, materials, and technologies.**

**BUSINESS CANNOT MAKE TRANSFORMATION HAPPEN
ON ITS OWN – IT MUST ALSO STEER, SUPPORT AND CONTRIBUTE
TO CHANGE THROUGH ITS INFLUENCE ON, AND INTERACTIONS WITH,
ENABLERS OF TRANSFORMATION**

**INNOVATION &
TECHNOLOGY**

Innovation processes that set goals around social and environmental impact as well as anticipate and avoid negative unintended consequences will be good for society, and will lead to more resilient business models.

**FINANCE &
INVESTMENT**

Finding ways for companies to direct investment towards socially, environmentally and financially sustainable outcomes will be essential to achieving Vision 2050.

**INDIVIDUALS &
CONSUMPTION**

Business has a role to play in enabling individuals to be agents of positive change. Giving people the options and incentives they need to make more sustainable choices is key to accelerating transformation.

**POLICY &
REGULATION**

Regulation creates the stable, predictable and fair conditions that companies depend on to invest, compete and thrive. Business must better support the design of policies that incentivize sustainable transformation.

Business must not just react to, but also shape, the technologies, investment opportunities, individual behaviours and demand, and regulatory and policy environments that will support progress along Vision 2050's Transformation Pathways.

WHAT KIND OF LEADERSHIP IS REQUIRED TO TAKE US FORWARD?

SHARED VISION

When business shares a common agenda, it can reach up and down entire value chains – and when that agenda is forward-looking, ambitious and optimistic, it can drive transformation through entire systems. Vision 2050 provides business with this shared vision. It defines the world we are seeking to create and lays out the mindsets, transitions and actions that will make it a reality. Business leads by unequivocally recognizing the urgent need for change, upholding the facts underpinning this urgency, and by being open and realistic about the necessary transformations that lie ahead.

SYSTEMS THINKING

Systems-thinking will be at the heart of progress towards our vision. It will open business leaders' eyes to the macrotrends, disruptions and innovations that shape the world their companies operate in; to risks to future resilience and profits; and to their companies' dependence on the stability and success of other industries and institutions, communities and ecosystems. Systems-thinking will drive us to be both bold and humble – confident that we can disrupt and transform systems to deliver a more sustainable world, clear-eyed about the collaborations that progress will depend on.

MINDSET SHIFTS

Our current systems will not deliver a world in which 9+ billion people can live well, within planetary boundaries. We need to shift our mindsets – about the purpose of businesses, about what it means to be resilient, and about how we can operate regeneratively, rather than destructively. These shifts will demand we pursue the transitions in our pathways, providing business with the reasons it needs to mitigate transition risks, factor in transition costs, and safeguard its ability to generate long-term value, and therefore its future success. They are the key to running companies well, well into the future.

LEADERSHIP ACROSS THESE AREAS WILL DRIVE THE ACTION REQUIRED TO REALIZE VISION 2050

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