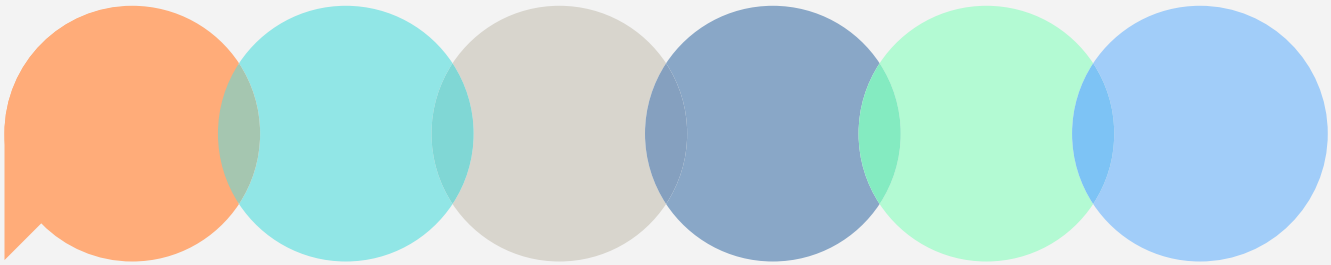
# Climate Framework©



A cross-industry action group initiative

# About the Cross-Industry Action Group

The Cross-Industry Action Group comprises a group of volunteers representing various professional institutes, and member organisations who have come together with a vision to unite the industry and academia, in the effort to upskill and build our collective capacity for climate action.

*"It is time to unite the industry and academia in the fight against climate change."*
**Mina**

*"An ambitious and essential initiative with a framework that is a cross-industry commons, not owned by any one institution."*
**Alex W.**

*"I support the acceleration of concerted efforts to upskill & to act ambitiously now."*
**Sui-Te**

*"Much needed effort that reflects the scale and urgency of the climate crisis."*
**Alex T.**

*"It's been great to collectively build this and I'm really looking forward to the impact it will have on industry and students."*
**Julie**

*"A timely and welcomed resource for upskilling of both current and aspiring practitioners in the built environment."*
**Boris**

*"This sustainable built environment roadmap is essential for everyone in our industry."*
**Sarah W.**

*"We must work together and with urgency to address the built environment's role in the climate emergency."*
**Sam**

*"We must act now and act collaboratively to avert the climate crisis."*
**Ann**

*"For people and for our planet, decarbonising and transforming our built environment must be done urgently."*
**Scott**

*"This ambitious initiative is incredibly important as it is across professional and academic boundaries."*
**Katja**

*"Cross industry collaboration is essential for accelerating net zero solutions."*
**Aaron**

*"Great to support a collaborative approach to accelerate climate action."*
**Anna**

*"It provides the base level of sustainability knowledge for the entire industry."*
**Joe**

*"A step towards joined-up thinking, urgently required to tackle the ecological and carbon impacts of our sector."*
**Sarah B.**

*"A comprehensive framework for steering sustainability in the built environment."*
**Mirko**

*"What a fantastic and essential initiative, bringing together our industry, universities and professional bodies."*
**Steve**

Climate framework

# Our Vision + Mission

*The urgent and interconnected challenges of climate change, ecological degradation, natural disasters, population growth, and rapid urbanisation—now with the added layer of a global pandemic—demand a realignment of our focus and priorities as built environment professionals.*

This reality also demands that we reassess our industry's capacity to respond effectively to these challenges—which means we need to re-evaluate the knowledge and skills that are needed, both globally and locally. In this era of rapid change and multi-layered challenges—which sometimes require us to address competing priorities—we must find multi-faceted and holistic responses that are delivered fast and at scale.

It has become clear that a single entity of any kind—be it a professional institute or an academic institution, a membership organisation, or a private practice—is simply not going to be enough to transform the entire industry globally, and accelerate the transition to a resilient and sustainable future. Collaborative action is essential to consistently provide solutions that are based on know-hows which continually shape and inform the knowledge delivered—whether in academia or in practice. Such knowledge must be nurtured with insights gained from the collective and collaborative experiences of applying that knowledge in practice.

This is the vision of the Climate Framework initiative—to unite the industry and academia in the effort to upskill and build our collective capacity for climate action. Our mission is to cross-pollinate experiences and expertise across the industry, embracing all disciplines, and creating a shared curriculum framework as well as a platform for holistic climate knowledge. In this united and coordinated effort, our aim is to break down silos and establish common ground, define a common language, and identify the holistic knowledge and skills every built environment professional must be equipped with in order to deliver truly sustainable built environments today and in the future.

# Supporting Organisations

The extensive support of the many professional institutes, membership organisations and academic institutions indicate the need and desire for greater collective action across the industry and academia to mitigate adverse impacts of climate change and ecological degradation.

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# Executive Summary

*This document presents a new, transdisciplinary, and holistic framework for the knowledge base that every current and future built environment professional will need to be equipped with in order to halt climate change and mitigate its adverse impacts.*

A group of leading industry professionals—called the Cross-Industry Action Group - who are representing different disciplines and organisations, have come together with the mission to unite the industry and academia in upskilling and building collective capacity for climate action.

The first output of the Group—the Climate Framework—is presented in detail throughout this document.

Significant amount of input has been provided by academia and industry over a three-month consultation, which has helped the Cross-Industry Action Group to develop this Framework in great consensus.

It is envisaged that the Framework can be taken as the base set of topics by any organisation, professional institute, or academic institution to use, customise, and to build appropriately detailed content—in line with their discipline, area of focus, and contextual priorities.

# Introduction

*In an era of rapid change and upheaval, with climate change ever-present as "the most systemic threat to humankind"[1], we rely on catalysing collective action to minimise adverse and permanent impacts of ecological breakdown. To achieve this, climate scientists urge us to take radical action to prevent global warming exceeding 1.5°C above pre-industrial levels by the end of this century.*

Limiting global warming to 1.5°C will be challenging—it will require rapid and far-reaching transitions at an unprecedented rate and scale—and it will rely on the global economy reaching net zero carbon by 2050 (Global Warming of 1.5°C, IPCC, 2018); with the built environment sector needing to transition to net zero carbon in 2030.

Developed jointly by a group of leading cross-industry professionals, the Climate Framework aims to create a comprehensive knowledge base that will be equally relevant for those in academia and those in practice, in order to equip current and future generations of professionals with the competence and confidence required to deliver on the 1.5°C ambition.

[1] António Guterres, Secretary-General of the United Nations, 2018

# Context

## The industry + academia are saying...

*"Everyone talks about net zero carbon buildings, but I really don't know how I can design a building to be net zero."*

*"I want my students to focus on nature-based solutions. Which are the best resources I can direct them to?"*

*"Wow! I didn't realise what impact my design decisions have on the natural environment and people."*

*"I now understand how all these 'sustainability' concepts I've heard before relate to each other. This will help my research at school."*

*"I no longer need to endlessly search online which industry guidelines I should focus on—they are all in one place now."*

*"I now feel confident to advise others on climate adaptation strategies especially in rapidly growing cities."*

*"I want to become an expert on health-focused built environments. Where do I start?"*

*"I learned about passive design strategies at school, but I don't know how to apply them in practice."*

*"I heard London is transitioning to circular economy. How will this impact building design and construction?"*

*"Our sustainability consultants talk about carbon factors. I now understand what they exactly refer to."*

*"I wish we collaborated with industry experts to bring insights of real-life project examples into our academic courses."*

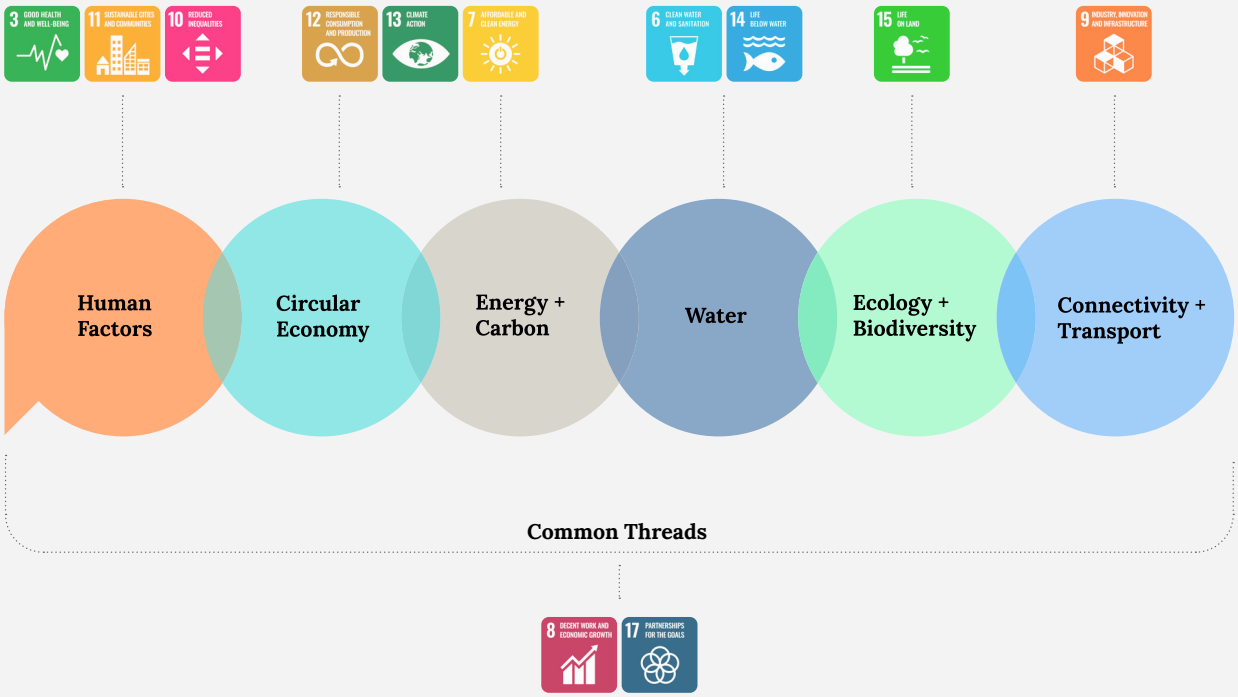
*"I am developing a new course. Which topics should I focus on to help students be better prepared for the future?"*

# The Framework

## Holistic Approach

Underpinned by the vision and the mission of the universally-embraced UN Agenda 2030 and the 17 Sustainable Development Goals, the Climate Framework is organised around six overarching themes, together with a series of 'common threads' that are shared by all. The six themes represent those areas, which can be influenced most directly by the built environment.

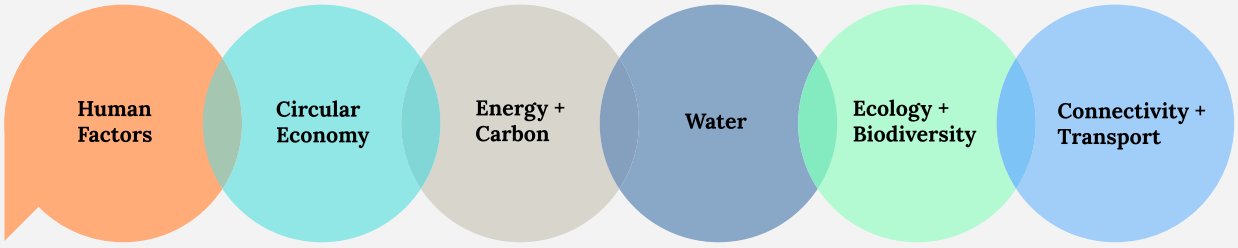
The Framework recognises the need to consider the key themes in a holistic manner in order to avoid unintended consequences. It also recognizes the need to address challenges both locally and globally, and for them to be contextualised according to the particular social, economic and environmental context.



# The Framework

## Proposed Structure

*The six main themes of the Framework are defined as 'outcomes'; each of which is then further defined consistently, by a series of five sub-themes. The sub-themes reflect the breath of the richness and depth of different concepts each overarching theme embraces and represents.*




| Human Factors | Circular Economy | Energy + Carbon | Water | Ecology + Biodiversity | Connectivity + Transport |
|---|---|---|---|---|---|
| Health + Wellbeing | Resource Efficiency | Passive Design | Water Cycle | Biodiversity | Site Location |
| Biophilia + Sense | Flexibility + Adaptability | Active Design + Systems | Water Recycling + Reuse | Nature-Based Solutions | Compact Development |
| User Experience | Impacts | Whole Life Carbon | Water Harvesting | Land Use | Infrastructure + Planning |
| Communities | Waste as a Resource | Carbon Offsetting | Water Pollution | Bioregional Planning | Low Carbon Transport |
| Social Value | Sourcing | Iterative Design | Climate Change Impacts | Food Production | Future Transportation |

(Note: For detailed Framework structure, please see Appendix, "Detailed Framework Structure").

# Learners' Journey

## Target Audience

*The holistic and interdisciplinary development of the Framework and its all-encompassing structure aim to create the knowledge base from which to upskill the entire built environment sector.*

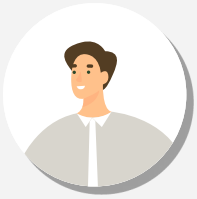
Considering this, the target audience of the Framework is built environment sector 'actors' / professionals of today and the future, as well as tutors, who are teaching the next generation professionals. It is envisaged that the Framework can be taken as the base set of topics by any organisation, institute or institution to use, amend according to their members' and/or schools' needs, and to build appropriately detailed content - in line with their discipline, area of focus and expertise.

## Tiered Structure

Recognising that varying degrees of knowledge and skills exist across the sector, the Framework adopts a three-tier structure that will enable content creators to identify specific learning outcomes and define the overall learner's journey—consistent with the objective of upskilling and building capacity. The aim of each tier is as follows:

Tier 1 - *Climate Aware*

To raise awareness, develop basic knowledge and understanding



Tier 2 - *Climate Adopter*

To gain industry-specific knowledge and skills, together with the ability to apply this in practice/ academic work

Tier 3 - *Climate Expert*

To develop a well-rounded knowledge base + build expertise, together with the ability to analyse, evaluate and use the further gained knowledge in a creative manner

# Consultation

## Consultation Process

*A nine-month, online consultation was undertaken to help shape and refine the Framework's structure—embedding input from as many disciplines as possible, throughout the sector. This consultation reached over 690 individuals across the international buildings and construction industry, as well as academia.*

## Key Findings / Insights

The responses received from both industry and academia have helped the Cross-Industry Action Group to develop the structure of the Framework in an iterative manner, and have identified the following needs:

1. **Consistency:** The need to consistently disseminate knowledge and share experiences, as well as insights between industry and academia

2. **Collaboration:** A need for greater collaboration among all stakeholders across the sector

3. **Comprehensiveness:** The need for an integrated, inclusive and multidisciplinary approach

# Appendices

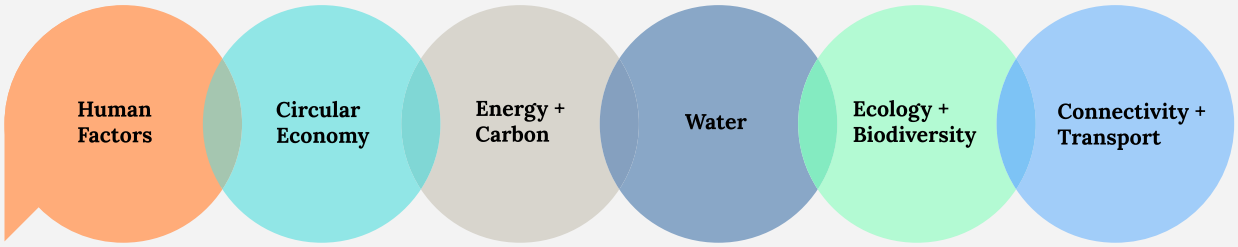
# Detailed Framework Structure

*The proposed Climate Framework consists of an introductory section that provides the essential background knowledge as it relates to climate change within the global and the built environment context, followed by the 'Outcomes' section, which specifically focuses on six overarching themes. These themes represent concepts that built environment professionals must holistically consider - both in retrofit and new build scenarios - in order to halt climate change, and mitigate its impacts.*

Global Context + Fundamentals

Built Environment Context

Common Threads

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| Health + Wellbeing | Resource Efficiency | Passive Design | Water Cycle | Biodiversity | Site Location |
| Biophilia + Sense | Flexibility + Adaptability | Active Design + Systems | Water Recycling + Reuse | Nature-Based Solutions | Walkability |
| User Experience | Impacts | Whole Life Carbon | Water Harvesting | Land Use | Infrastructure + Planning |
| Communities | Waste as a Resource | Offsetting | Water Pollution | Bio-Regional Urbanism | Low Carbon Transport |
| Social Value | Sourcing | Iterative Design | Climate Change Impacts | Food Production | Future Transport |

# Context

## 1 Introduction [to the Climate Framework]

**Purpose**
**Audience/Reader**
**Learning Objectives/Outcomes/Standards**
**[Framework] Structure and Mapping**
**Key Concept and Definitions**

## 2 Global Context and Fundamentals

**Climate Fundamentals**

— Climate Change
- Scientific Evidence
- Key Indicators and Monitoring
- Key Contributors, Individual & Collective Responsibilities, Carbon Budget and Debt
- Projected Physical Impacts (on Land, Nature, etc.) and Regional Priorities
- Psychological & Physical Health Impacts and Social Awareness

— Resource Use
- Current Trends and Future Prospects of Natural Resources
- Socio-economic Implications of Irresponsible Resource Use
- Planetary Boundaries, Resources and Climate Change
- Sustainable Resource Use and Management
- Shifts in Global, Regional & Local Land Use, Migration, Displacement and Conflict

— Systems Thinking
- Measurable Changes in Earth's Systems and Processes
- Causes and Effects of Global Changes
- Socioeconomic Drivers and Economic Consequences
- Risk & Resilience, the Role of Data / Feedback
- Regenerative Leadership

**International Legislations, Agreements, Frameworks, Roadmaps and Plans for Action**
- United Nations Framework Convention on Climate Change, The Kyoto Protocol and the Doha Amendment
- United Nations Agenda 2030: Sustainable Development Goals, Global Indicator Framework for SDGs and Targets of the 2030 Agenda, The New Urban Agenda and Race to Zero & Race to Resilience Campaigns
- The Paris Agreement and Regional (EU) Directives
- Sendai Framework for Disaster Risk Reduction
- The Sharm El-Sheikh to Kunming Action Agenda for Nature and People, Global Species Action Plan (GSAP) and Strategic Plan for Biodiversity (with Aichi Biodiversity Targets)

**Risks and Opportunities in a Net Zero Economy**
- Climate Change & Biodiversity Loss Risk Management and Nature Economy
- Physical Risks (Stranded Assets), Monitoring / Measurement, Opportunities and Actions
- Transition Risks (Renewable Energy Technology Developments) and Environmental & Social Value
- Global Institution/Sector Economy and New Economic Models
- Circular Economy Implementation and Climate Positive Economy

This section covers topics on climate science, systems thinking, global policies and commmitments...

# Context (continued)

## 3 Built Environment Context

**Environmental Impacts and Drivers of the Built Environment**

- Sustainable Consumption and Production, Scale, Balance and Monitoring
- Impacts on the External Environment (Land Use, Air, Soil, Water Pollution, Other Greenhouse Gases)
- Impacts on the Internal Environment (Energy and Water Use, Waste, Thermal Efficiency, Health)
- Building Whole Life and Product Life Cycles
- Cross-cutting Themes

**Ethics and Value of Sustainability**

- Ethics in Practice
- Health, Wellbeing, Safety and Resilient Communities
- Rights of Nature
- Rights of Current and Future Generations
- Supply and Value Chains

**Sustainable Urbanism, Architecture and Engineering**

- Vernacular Design (in Different Climates / Regions)
- 19th Century Industrial Revolution: Building in a Time of Industry
- 20th Century International Style: Building in a Time of Globalisation
- 21st Century Imperative: Building in a Time of Emergency
- Regenerative Urban Development, Buildings, Infrastructure and Growth

**Built Environment Policy, Legislation, Regulations, Commitments, Frameworks, Benchmarks and Construction Industry Guidance**

- Policies, Legislation, Regulations, Carbon Budgets and Implementation
- Overview of (Key) Existing Guidance, Targets and Standards (ISO, CEN, EPD, HPD, RIBA, AIA, LETI, UKGBC, CIBSE, RICS, BBP, IStructE, etc.)
- Overview of (Key) Existing Commitments, Roadmaps and Frameworks (WorldGBC, GlobalABC, C40, etc.)
- Other Mechanisms for Change (Certifications such as BREEAM, LEED, WELL, NABERS, DGNB, HQE, Green Star, CASBEE, BEAM Plus, GORD, One Planet Living, Living Building Challenge (The Red List Materials), Passivhaus and Declarations,)
- Advocacy, Commitments/Pledges and Policymaking

**Construction and the Real Estate Industry**

- Activities, Briefing, Decision-Making and Communication
- Stakeholders and Values
- Governance
- Construction Processes and Supply Chains
- Financing Models

# Context (continued)

## 4 Common Threads

**Retrofit (Adaptation and Reuse)**

- Retrofit Primer: Scale, Urgency, Challenges and Opportunities
- Hierarchy of Interventions: Passive Design, Retro-First, Fabric and Fuel
- Whole Building Approaches: Rethinking Retrofit Delivery and Cost
- Energy Efficiency Action Plan (for Buildings), EnerPHit and Net Zero
- Transitions: Incentives, Policy and Engagement

**Building Safety**

- Fire & Life Safety and Sustainability in the Built Environment
- Material Traceability and Transparency
- Information Thread, Maintenance and Performance Certainty
- Toxic Materials and Long-term Health
- Roles and Responsibilities

**Designing for Performance, Feedback and Closing the Performance Gap**

- Outcome-based Design
- Integrated Systems, Technologies and Controls
- User Engagement and Training
- Commissioning, Monitoring and Post Occupancy Evaluation
- Roles and Responsibilities

**Planning for (Climate) Extremes, Disaster Risk, Resilience/Robustness, Redundancy and Adaptation**

- Climate Change Impacts (from Increased Temperatures (Heatwaves and Urban Heat Island Effect), Winds, Wildfires, Sea Level Rises, Increased Precipitation, Storms, Floods, Droughts, Earthquakes)
- Vulnerability (Exposure and Sensitivity) and Adaptive Capacity
- Proactive Adaptation and Managed Retreat
- Climate Buffers and Reactive Adaptation
- Stakeholders and Participation

**Climate Justice, Equitable and Inclusive Design**

- Dimensions of Climate Justice
- Designing for Equitable, Healthy and Universal Communities
- Access to Affordable, Green Energy, Resources and Opportunities
- Access to Sustainable Housing, Work, Leisure and Green Spaces
- Accountability, Responsibility and Distribution of Economic Investment

**Procurement, Process and Investment**

- Funding and Investment (for the Asset and the Team)
- Alternative Development Models
- Value Approach to Procurement (Value Toolkit)
- Team Formulation and Delivery/Validation Process
- Sustainable Outcomes Value and Life Cycle Costing

# Context (continued)

## 4 Common Threads

**Stakeholder Engagement**

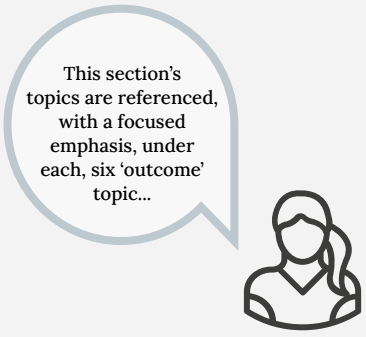
- Co- and Participatory Design
- Stakeholders Representation
- Roles and Responsibilities
- Business Case and Brief
- Engagement and Communication Strategy

**Research, Innovation and Partnerships**

- Research-based Design and Implementation in Practice
- "Interprofessionalism": Transdisciplinary and Interdisciplinary Approach
- Future Scenarios: Benchmarking and Analysis through Digital Innovation
- Governance and Funding
- International/Regional/Local Agency, Institutions and Partnerships







# Outcomes

## 1 Human Factors

**Context**

**Health, Wellbeing and Comfort**

- Air Quality (Indoor and Outdoor) and Olfactory Comfort
- Thermal Comfort (Indoor and Outdoor)
- Visual Comfort (Daylight, Lighting and Glare)
- Acoustic Comfort and Noise Mitigation
- Ergonomic Comfort and Accessibility

**Biophilic and Sensory Design**

- Place-based, Human-Nature Relationships and Multi-sensory Design
- Environmental Features (Air, Water, Plants, Natural Habitats, Sound, etc.), and Sensory Stimuli (Physiological and Physical Factors)
- Natural Forms/Shapes, Patterns and Systems (Biomimicry)
- Light, Space and Color
- Materials and Textures (Hapticity)

**User Experience Design and Occupancy Behaviour**

- Human-Centered Research and Design Approach: Expectations, Interaction and Space
- User Experience (UX) Design and Learning Process
- Occupancy Patterns and Zoning
- Interdisciplinary Collaboration and Prototyping
- People-Space/Building Communication: Smart Controls, Integrated Technology Systems and Real-time Feedback (Post Occupancy)

**Communities, Interconnectivity and Inclusion**

- Healthy Placemaking, Community Building and Identity
- Accessibility Mapping, Universal Design and Security
- Inclusivity / Diversity Mapping
- Context Mapping and Scenario-based Design (Existing Context, Designed Context and Altered Context)
- Just / Equitable Transition

**Social Value**

- Stakeholders Interests: Social, Economic and Environmental
- Desired Outcomes
- Measuring Social Value: Assessment and Methodologies
- Social Return on Investment
- Trade-offs and Synergies

**Case Studies**

**Resources (Tools and Guides)**

# Outcomes (continued)

## 2 Circular Economy

**Context**

**Resource Efficiency, Sufficiency and Geographic Implications**

- Natural Capital and Capitals Approach
- Urban Systems and Circularity
- The R's of Circular Economy: Reduce, Reuse, Repair, Repurpose, Recycle
- Waste Sources and Reduction
- Choice of Construction Methods

**Designing for Change (Flexibility and Adaptability) and Regeneration**

- Designing for Circularity (Resource Flows)
- Designing for Disassembly, Deconstruction and Reassembly (Prefabrication, Standardisation, Panellisation)
- Designing for Flexibility (for Change of Space within the Same Use)
- Designing for Adaptability (for a Change of Use and Climate), Durability and Resilience
- Designing for Leasibility: from Products and Spaces to Services

**Waste as a 'Resource'**

- Waste Sources from the Built Environment: Materials, Energy, Water, Organic Matter
- Waste-to-Material/Product (Upcycling and Downcycling)
- Waste-to-Energy (Heat and Electricity)
- Waste-to-'Food' (Composting)
- Waste-to-Nature (Decomposition)

**Environmental and Health Impacts of Materials and Waste**

- Carbon Impact (Recycle Content, Recyclability, Bio-based and Biogenic Materials)
- Chemical Impact (Toxicity)
- Material and Product Declarations/Certifications/Disclosure (EPD, HPD, C2C, FSC, etc.)
- Waste Impact (Hazards)
- Pollution on Air, Water and Land

**Responsible and Ethical Sourcing**

- Procurement, Supply Chain Management and Auditing
- Value Chain and Stakeholder Health and Wellbeing
- Green and Lean Upstream Production
- Downstream Distribution
- Social Procurement

**Case Studies**

**Resources (Calculations, Tools, Databases and Guides)**

# Outcomes (continued)

## 3 Energy and Carbon

**Context**

**Passive Design**

- Climate and Microclimate
- Building Orientation, Form, Form Factor and Layout
- Thermal Mass
- Fabric First Approach, Thermal Comfort and Overheating
- Passive Heating and Cooling

**Active Design: Environmental Systems and Technologies**

- Building Systems
- Energy Demand, Supply Sources and Balance (Heat Gains and Losses)
- Energy Storage, Load Sharing and District Networks
- Smart Systems, Technologies, Monitoring and Maintenance
- Low Carbon and Renewable Energy Supply

**Whole Life Carbon Impacts (for Retrofit and New Build)**

- Upfront Impacts (Stage A): Product and Construction
- In-Use (Embodied and User) Impacts (Stage B) and Capital Carbon
- End-of-life (Embodied) Impacts (Stage C)
- Beyond Building Life Cycle (Module D)
- Biogenic Carbon, Carbon Capture, Storage, Sequestration and Carbonation/Calcination and Direct Air Capture Technologies

**Offsetting and Carbon/Offset Credits**

- Carbon Offset Projects
- Renewable Energy Procurement
- Carbon Accounting
- Carbon Offset Purchasing and Contracts
- Ethics and Limitations of Carbon Offsetting

**Iterative and Integrated Design and Delivery Process**

- Regulated vs. Unregulated Energy Sources
- Operational Energy Modelling
- Life Cycle Assessment: Embodied Carbon and other Environmental Indicators
- Iterative Design Process and other Environmental Assessments
- Stakeholder Responsibilities

**Case Studies**

**Resources (Methodologies, Tools, Databases and Guides)**

# Outcomes (continued)

## 4 Water

**Context**

**Water Cycles, Sources, Stresses, Quality and Management**

- Water Cycles
- Water Sources and Uses
- Water Availability and Stresses
- Water Quality and Sanitation
- Water Distribution and Management

**Water Recycling and Reuse**

- Benefits and Challenges
- Wastewater Sources
- Wastewater Treatment and Reuse
- Technological Advancements
- Health, Environment and Socioeconomic Outcomes

**Rainwater Harvesting, Stormwater Management and Sustainable Urban Drainage**

- Benefits and Challenges
- Water Runoff, Quantity and Quality
- Rainwater Uses
- Catchment and Storage
- Sustainable Urban Drainage Systems

**Water Pollution on Land and in Aquatic Habitats**

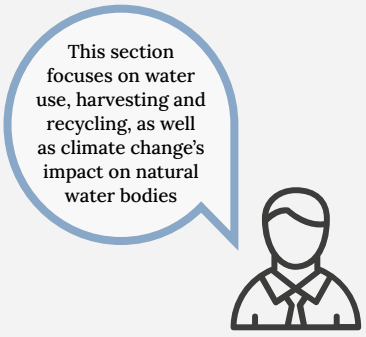
- Water Pollution Sources
- Causes and Effects
- Water Pollution Prevention
- Water Pollution Control
- Water Pollution Monitoring and Management

**Impacts of Climate Change (Water-related Hazards and Disasters)**

- Impacts on People & Nature and Cascading Events
- Designing for Water Scarcity and Droughts
- Designing for Intense Rainfall, Storms and Wind Damage
- Designing for Sea Level Rise and Flood Risk
- Adaptation Opportunities and Challenges [to reducing Vulnerabilities]

**Case Studies**

**Resources (Calculators, Tools and Guides)**



# Outcomes (continued)

## 5 Ecology and Biodiversity

**Context**

**Biodiversity and Net Gain**

- Biodiversity Value and Habitat Evaluation: Factors, Impacts, Risks, Pre- and Post-Development Conditions
- Key Actors and the Business Case
- Mitigation Hierarchy, Conservation/Restoration and Multi-layered Outcomes
- Measurement and Monitoring
- Offsetting Net Biodiversity Loss

**Nature-based Solutions**

- Benefits
- Barriers and Trade-offs
- Key Actors and Implementation Process
- Balanced Solutions at Scale
- Advanced Solutions: Bio-based Products and Processes

**Land Use and Urban Density**

- Land Use Activities and Models
- Land Use Changes
- Pressures: Environmental, Socioeconomic, Cultural
- Demand and Supply: Human Needs and Natural Capital
- Land Use Planning, Zoning and the Built Environment

**Bioregional Planning and Biophilic Urbanism**

- Citizen Participation and Action-oriented Planning
- Place-based Design
- Balance of the Urban Metabolism
- Green Regionalism and Infrastructures
- Responsible Regionalism and Environmental Ethics

**Sustainable Food Production and Urban Food Systems**

- Benefits and Challenges
- Farming Methods and Land Balance
- Productive Landscapes: Urban, Rural and Peri-Urban Farms
- Building-integrated Solutions
- Regenerative Agricultural Practices

**Case Studies**

**Resources (Tools and Guides)**

# Outcomes (continued)

## 6 Connectivity and Transport

**Context**

**Site Selection, Location and Urban Ecosystems**

- Economies of Scale: Environment, Economic and Social Implications
- Landlocked and Transit-bridging Sites
- Greenfield, Brownfield and Reclaimed Sites
- Urban Accessibility
- Rural Accessibility

**Compact Development and Walkability**

- Change in Behaviours and Health Benefits
- The '15-minute' Neighbourhood and City
- Safe, Walkable, Liveable Streets, Car-free Centres and Mobility Hubs
- Complete Streets and Curbside Management
- Mobility Corridors: Green Infrastructure

**Regional and Local Infrastructure and Planning**

- Sustainable Transportation Indicators
- Polycentric, Unicentric and Regenerative Communities
- Sustainable Land Use Planning
- Shifts in Infrastructural Modes
- Digital Infrastructure and Resilience

**Low Carbon Transport and Multimodal Transportation Networks**

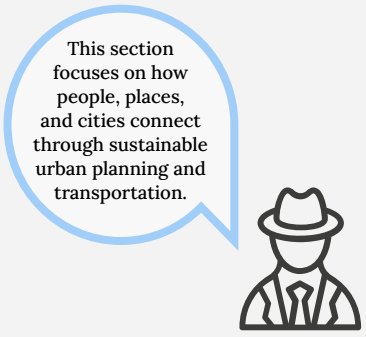
- Flows and Capacity
- Active Travel (Walking, Cycling, etc.)
- Electric Vehicles and Charging Infrastructure
- Car Sharing
- Autonomous Vehicles

**Planning for Future of Transportation**

- Net Zero Carbon Regeneration and Renewal
- Strategic Logistic Hubs
- Demand and Sustainability of Alternative Fuels
- Investment and Risks
- Sustainability and Livability Planning Trends

**Case Studies**

**Resources (Calculators, Tools and Guides)**



# Resources

## Resource Selection + Categorization

A select sample of resources have been reviewed and gathered on the Climate Framework's website www.climateframework.com. These resources link to existing content developed by expert individuals and organisations across the international buildings and construction industry, as well as academics, governmental and non-governmental bodies.

All the resources included on the Climate Framework's website have been categorized according to their length, depth/detailing of content, audience, media type, and project stages - some of which are represented with icons (as seen below):

### Time to read

- Short (≤1 hour)
- Medium (1-5 hours)
- Long (≥5 hours)

### Level of difficulty

- Basic (tier 1)
- Intermediate (tier 2)
- Advanced (tier 3)

### Media type

- Video / Webinar / Event
- Case studies
- Database / Platform
- Tools / Software
- Report / Guidance / Standard
- (Research) Paper / Journal / Article
- Legislation / Regulation / Policy
- Online course
- Other media type

# Resources

## Disclaimer

The Cross-Industry Action Group has endeavoured to fully recognise the originators of the content and their material to which the links are provided. The shared, online resources are free for use, and intended for educational purposes only. Direct links to PDF documents have been avoided, thus preventing any issues that may arise in relation to 'deep-linking' or bandwidth-theft. Maximum care has been given to the referencing of not only published material, but also pictures, quotes, videos, etc.—with a full reference list published on the Climate Framework's website, acknowledging from where and whom the sources have come.

To the best of our knowledge, the Cross-Industry Action Group has safeguarded against plagiarising or infringement of copyrights, but should anyone find any issues, we would kindly ask you to report them to us, so that we can make immediate corrections.

The Cross-Industry Action Group cannot guarantee that the third-party content is suitable for your purposes, accurate, complete or up-to-date. Hence, the Climate Framework and its authors cannot be held liable for any issues arising in contract, tort (including negligence) or otherwise, and will not be liable to you for any direct, indirect or consequential loss or damage, arising in connection with your use of, or reliance on, the select resources included within this document and on the Climate Framework's website at www.climateframework.com.

We would like to take this opportunity to also clarify that the list of resources provided is at its first phase of development. As such, the list is not exhaustive, nor it claims to capture all of the resources on any given topic. The Cross-Industry Action Group is therefore, inviting authors, PSRB's, industry and academia to join our community, get in touch, and share any additional resources with us, by completing this form, that they would recommend to be included on the Climate Framework's website. These resources will be added to the online library, subject to the review panel's recommendation. In this manner, the Cross-Industry Action Group can ensure that the content of this online resources' library is constantly expanded and updated, making it fit for its purpose to the benefit of all.

# Endorsement + Support

## Industry

> *"The Construction Industry Council is delighted to support the Climate Framework. The Framework will equip built environment professionals with effective knowledge and skills to accelerate the transition to net zero carbon built environments. It fits perfectly with the work being done by the education workstream within our Climate Change Committee as it seeks a wide-ranging collective CPD programme for the industry."*
>
> **Stephen Hodder, CIC Chairman & Chair of the CIC Climate Change Committee**

> *"The Climate Framework is the culmination of one of the most profound cross sector collaborations within the UK construction Industry in recent times. The aim of this framework came out of early workshops within the RIBA Sustainable Futures Group to create a common understanding of the core concepts and strategies required to address the climate and bio-diversity, and to deliver a regenerative and sustainable future for the planet. The working group expanded to encompass sustainable action groups from other sectors, culminating in its endorsement by the Construction Industry Council which represents all the UK construction industry professional bodies. I can't express how important this framework is to upskilling the current and future generations of the construction industry. Now the framework is defined, the next goal is to create the crowd-sourced content within each of the sections as fast as possible during 2021. On behalf of the RIBA Sustainable Futures Group, I thank Mina and the Cross-Industry Action Group for Education for a fantastic piece of collaborative work."*
>
> **Gary Clark, Chair, RIBA Sustainable Futures Group**

> *"Construction faces major challenges and must change. Building safely in our rapidly changing climate demands a change of culture and that extends to the way we educate and train our people. We need new skills for safe, low carbon construction using digital tools and increasingly building off site. The Climate Framework is an essential foundation, setting out how we teach the knowledge and skills for a low carbon sector equipped to deliver net zero carbon by 2050."*
>
> **Hywel Davies, Technical Director, CIBSE**

> *"Responding to the challenges of climate change by necessity has to be a collaborative effort undertaken with a great deal of urgency. The launch of the Climate Framework will be of great benefit to those working at the interface of industry and academia and the challenges they face in formulating the necessary holistic curricula for our future young professionals—whatever their discipline."*
>
> **Martin Powell, Chief Executive, The Institution of Structural Engineers**

*"Climate change is one of the defining challenges of our time, and one which architects have a significant role in addressing. It is vital that architects have access to the best shared knowledge available so that they are able to make informed decisions and advocate for sustainable design solutions. I am delighted to see the content of the Climate Framework Structure, which will be an invaluable learning resource for architects looking to increase their knowledge on sustainable practice."*

**Simon Howard, Director of Regulation, ARB**

*"We all, individually and professionally, have a role to play in addressing the climate crisis. By equipping future generations with the right skills, we can create sustainable low-carbon places, which are resilient to the risks of a changing climate, including flood and urban heat. The Landscape Institute is mandating new skills and standards of its members, and we are committed to working across disciplines to collectively build the skills needed to fight this crisis. The Climate Framework can be an excellent contribution to this agenda."*

**Daniel Cook, Chief Executive, Landscape Institute**

*"We all urgently need to learn how to deliver a net-zero carbon emission built environment, something that can only happen if the many disciplines in the sector work together. A joint curriculum, shared across the industry, is an essential component in achieving this, so many thanks are due to the Cross Industry Action Group for developing this very necessary learning framework."*

**The Edge**

*"The real estate industry is committed to decarbonising its activities and to addressing the numerous challenges of climate change. For the industry to be truly sustainable we will need to be the facilitators of a change in consumer behaviour, implement solutions across sectors, across activities, and through collaboration across disciplines. Any resource that provides a framework for this action will be well received. We are proud to support the Climate Framework as an important knowledge resource that will help take the built environment profession and academia in a common direction."*

**Melanie Leech, Chief Executive, British Property Federation**

*"The CAA's recent 'Survey of the Built Environment Professions in the Commonwealth' identified a critical shortage of built environment professions in many of the Commonwealth countries which are urbanising most rapidly and are among the most vulnerable to climate change impacts, together with a corresponding lack of educational capacity and a weakness in built environment policy. The Climate Framework will make an important contribution in the context of capacity development, and will help promote climate literacy among students and practitioners alike."*

**Peter Oborn, Vice President, Commonwealth Association of Architects**

*"The Climate Framework is a much needed initiative to help increase the industry's knowledge base and ensure a consistent approach to learning and development. This comprehensive resource will provide clarity in many areas relevant to both sustainability professionals and non-specialists alike. It will put us in a much better position to tackle the challenge ahead to decarbonise the built environment by 2030."*

**Richard Quartermaine, Chair, Sustainability Committee, British Property Federation**

*"As CAT has taught for many years in our postgraduate architecture and building courses, as we as through our practical hand-on short courses, sustainability and concern about a project's environmental impact can no longer afford to be optional extras but must be at the heart of the project life cycle, from concept design to finished building and beyond. We welcome the Climate Framework's initiative to ensure that these concepts form a fundamental part of the education of every built environment professional."*

**Peter Tyldesley, Chief Executive Officer, Centre for Alternative Technology**

*"The Alliance for Sustainable Building Products' mission is to accelerate the transformation to a healthy, low carbon built environment by championing the use of demonstrably sustainable building products. As such, we recognise the immense value that the Climate Framework will bring to achieving this through upskilling current and future built environment professionals, and building capacity across the sector. The ASBP are happy to support the initiative."*

**Jane Anderson, Board Member, The Alliance for Sustainable Building Products**

*"World Green Building Council has set ambitious and unprecedented goals for the building and construction sector to ensure we achieve a net zero, healthy and resilient built environment. For this ambition to be converted into action, we must urgently mobilise our entire industry towards greater sustainability. This includes the crucial upskilling and education of current and future professionals to unlock the very best approaches to sustainable development. We welcome this important initiative and look forward to supporting its implementation."*

**Cristina Gamboa, CEO, World Green Building Council**

*"UKGBC fully supports the idea of a Climate Framework which provides common ground for holistic, cross-disciplinary action and enhances sustainability awareness, and knowledge and upskilling of Built Environment professionals."*

**Julie Hirigoyen, Chief Executive, UK Green Building Council**

*"We live in a new reality. Climate change and ecological collapse threaten the survival of billions of people in decades and within the lifetime of people alive today. This generation and next need to think differently. The Climate Framework will set students and industry on the right path with a sense of urgency which should not scare us, but inspire us."*

**Pooran Desai, CEO, OnePlanet Living**

*"I welcome the Climate Framework, which recognises the need for industry and academia to share a common sector-wide framework that describes the knowledge and skills required to deliver a sustainable built environment."*

**Dr Judit Kimpian, Chair, Sustainability Group at Architects' Council of Europe**

*"We have a sustainability skills emergency in the real estate sector. If we are to deliver on net zero ambitions across the whole industry, we must ensure that responses to climate change are embedded in real estate education, professional training and competencies. The diverse issues and interventions that are required necessitate sector wide engagement and collaboration, which is why the BBP is delighted to support this Climate Framework."*

**Sarah Ratcliffe, CEO, Better Buildings Partnership (BBP)**

*"Architects Declare enthusiastically endorses the Climate Framework. This is another significant piece of the collective jigsaw being created by the climate movement within the construction industry to accelerate our transition to net zero. In creating that golden thread of knowledge linking industry to academia it provides the essential framework on which we can all build a transformed built environment."*

**Julia Barfield, Architects Declare**

*"UK Structural Engineers Declares welcomes and supports this initiative that seeking to raise the level of knowledge and understanding at all stages of learning. Our declaration is based on the need for trans-disciplinary collaboration and commitment to change. Shared understanding is fundamental to being able to achieve our shared vision."*

**Dr Mike Cook, UK Engineers Declare & UK Structural Engineers Declare**

*"The biggest single barrier to achieving a zero carbon built environment is a lack of knowledge across the industry. This vital initiative by the Cross Industry Action Group for Education is therefore crucial to removing this barrier and contributing to a zero carbon economy."*

**Simon Sturgis, Chair, Whole Life Carbon Network**

*"The Alliance for Sustainable Building Products' mission is to accelerate the transformation to a healthy, low carbon built environment by championing the use of demonstrably sustainable building products. As such, we recognise the immense value that the Climate Framework will bring to achieving this through upskilling current and future built environment professionals, and building capacity across the sector. The ASBP are happy to support the initiative."*

**Jane Anderson, Board Member, The Alliance for Sustainable Building Products**

*"ACAN calls for a complete remodelling of our professional culture and the manner in which we produce, operate and renew our built environment. We must work together with a clear understanding of all the issues that have pushed us into a global climate emergency. The Climate Framework is a comprehensive and confident step towards equipping our industry for the future."*

**Architects Climate Action Network (ACAN)**

*"The health of our planet is inextricably linked to both human health and the strength of our socioeconomic institutions. It's critical that we put forward an integrated approach to translate the research behind how buildings impact planetary and human health into practice, while working to advance the UN Sustainable Development Goals (SDGs)."*

**Jason Hartke, Executive Vice President, External Affairs, International WELL Building Institute**

*"The Climate Framework provides a comprehensive, holistic outline built environment professionals and academia must understand and implement in order to accelerate actions towards a zero carbon built environment by 2030 and meet the Paris Agreement 1.5ºC Targets. By utilizing this framework, both the profession and professional design schools will be well poised to provide the leadership needed to address what we deem to be this century's greatest challenge – the preservation of a habitable planet."*

**Ed Mazria, CEO, Architecture 2030**

*"At Hawkins\Brown we have long argued that improving carbon literacy across the built environment sector is critical in achieving Net Zero; we welcome the Climate Framework's transdisciplinary and holistic approach to upskilling both industry and academia, in all aspects of sustainability. We look forward to a fruitful knowledge share that will help us reach our shared goal of limiting global warming to 1.5°C."*

**Louisa Bowles, Partner, Head of Sustainability, Hawkins\Brown**

*"Developing the skills and understanding so that everyone can play their part in tackling the climate crisis is essential to creating a built environment fit for future generations. We welcome the Climate Framework Initiative as an important enabler of this."*

**Michael Cross, Head of Partnerships and Innovation Group Sustainability, Willmott Dixon Holdings**

*"The built environment has a large role to play in addressing the climate emergency, and it is encouraging to see how far our industry has moved in just the last few years. We know what needs to be done, but collectively, we need the skills to do it. The launch of the Climate Framework comes at the perfect time for us as we change our business structure, our design processes and upskill our staff to meet the challenge. Access to this comprehensive resource will give us the knowledge needed to deliver the change required."*

**Mario Vieira, Head of Sustainability, Scott Brownrigg**

*"It's time to rethink the way we shape our urban environment – to trigger a disruptive change with a Cradle to Cradle® approach."*

**Marco Abdallah, Head of Engineering, Drees & Sommer UK**

*"Buildings are exceptionally complex parts of our urban infrastructure. Bringing building professional together in the Climate Framework will through collaboration and knowledge sharing lead to enhanced knowledge for all and better buildings. I have always said that an intelligent building is one that is designed to meet the needs of all stakeholders, which now clearly includes Climate Action, only through collaboration can we achieve great buildings."*

**Geoffrey Palmer, Director Buildings, Sweco UK**

*"The team at the Supply Chain Sustainability School are delighted to support the Climate Framework Initiative. So much of your mission reflects what we have been working hard on over the last 8 years. To have an initiative that joins up designers, professionals and clients on a global scale to address this challenge is a great ambition."*

**Ian Heptonstall, Director, Supply Chain Sustainability School**

*"We are committed to helping construction professionals make informed and appropriate decisions to facilitate climate change mitigation and adaptation and fully support the Climate Framework initiative. Its pan-discipline, multifaceted approach to tackling climate change, and recognition of the interconnections between issues is particularly useful."*

**Elaine Toogood, Head of Architecture, The Concrete Centre, part of the Mineral Products Association**

*"This is a great initiative to raise the level of skills in the industry to deliver a more sustainable the built environment. Access to best practice knowledge will help accelerate our transition to a zero carbon economy."*

**Ashley Bateson, Partner, Hoare Lea / Building Services Engineers Declare Signatory**

*"Over the past year we have seen net zero carbon commitments from both business and governments double, but the challenge now is to move to the stage where the action happens. At JLL, as well as making our own global commitment by 2030 we are committed to using our full influence to spearhead the wider adoption of net zero carbon buildings, driving the pace of change across the real estate industry. Improving knowledge within the industry is essential for understanding how net zero carbon commitments will be delivered and the Climate Framework is a fantastic tool that will help to educate, and also drive the industry in the right direction."*

**Sonal Jain, Net Zero Carbon Director, JLL UK**

*"Grimshaw are pleased to support this Framework with its important role in helping to support the industry and academia in a cross-disciplinary and holistic manner to provide a thorough knowledge base. This is vital so that all parts of the value chain have the knowledge and skills to accelerate the transition to net zero carbon built environments that we all desperately need."*

**Paul Toyne, Practice Leader, Sustainability, Grimshaw**

*"The built environment profession must come together and work collaboratively across professional boundaries to be able to meet the challenges ahead and deal with an ever-increasing complexity of our build environments. The Climate Framework helps to break down silos and build a common understanding across professional disciplines, students and academic research. It is an important and accessible resource, and we are delighted to support and contribute to this initiative."*

**Katja Stille, Chair, Urban Design Group**

*"The Construction Industry Development Board is delighted to support the Climate Framework initiative. To have such an initiative that brings all the professionals of the construction industry on the same platform to address this challenge is indeed laudable. This will help upskill and build our collective capacity for climate action in order to create a more sustainable built environment."*

**Ram Bahadoor, Executive Director, Construction Industry Development Board (Republic of Mauritius)**

*"At The Prince's Foundation we champion a sustainable approach to how we live our lives and build our communities through education, capacity building and practice both nationally and internationally. Indeed for over fifty years, our President HRH The Prince of Wales has used his unique position to champion action for a sustainable future. The Climate Framework very much aligns with our values and is an excellent example of how we can ensure our built environment professionals have the knowledge, skills and capacity to address the climate emergency and build the future of tomorrow. The Prince's Foundation are pleased to support this initiative."*

**Ben Bolgar, Senior Director, The Prince's Foundation**

*"The scale and pace of action needed to deal with the climate emergency means that built environment professionals must collaborate effectively. The Climate Framework helps us all speak a common language and access a shared set of resources – both of which will be invaluable in the years ahead."*

**Andrew Crudgington, Climate Change Associate, CIHT**

*"Trees are the largest, longest lived natural element in our built environment delivering a wide range of environmental, social and economic benefits and often outliving the lifetime of buildings. Existing trees should be treated as precious assets and they must be accommodated in the design and development of places whether new sites or regeneration. The Climate Framework Initiative recognises the climate and ecological crisis that we are in globally and in the UK. The Committee on Climate Change wants us to plant 30,000 hectares of trees each year by 2050 and these must be long-lived trees, not rapid fixes for off-setting! Equally the UK is one of the most nature deprived countries in the world and so restoring biodiversity is a key action starting now. Covid 19 has also shown how vital it is to provide people with access to nature. Trees provide the long-lived framework in urban environments for nature based solutions and have a critical role in reducing the urban heat island effect (understand that looking after existing trees will increase canopy cover more effectively than depending on only planting new ones); contributing to the management of surface water to reduce the risk of flooding; improving the environment of the spaces between buildings; providing the linear routes between biodiverse green spaces for wildlife; enhancing the environment for active travel providing shady routes in hot weather and generally providing healthier environments for people."*

**Sue James AA Dipl RIBA, Convenor of the Trees and Design Action Group**

*"Collaboration and a shared ambition are critical components of the built environments collective response to the climate emergency. The Climate Framework represents a shining example of this vision, and a template for all to unify behind."*

**Jo Bacon, Partner, Allies and Morrison**

*"The CIOB's objectives, defined by our Royal Charter, include the promotion for the public benefit of the science and practice of building and construction as well as the advancement of public education in that science and practice. No current definition of public benefit can neglect our role in tackling the climate and ecological crisis that we face. CIOB is delighted to endorse the Climate Framework, and particularly values the holistic approach taken and alignment with the UN Sustainable Development Goals. It is essential that everyone working in our industry has sufficient climate literacy and wider sustainability knowledge to go about their work in a way that reduces harm and enables us to make a positive impact. If we are not providing our members with this understanding, then we are not only failing to make a contribution to the defining challenges of our time, but we are also failing to prepare them for a jobs market that will increasingly demand green knowledge and skills."*

**Amanda Williams, Head of Environmental Sustainability, Chartered Institute of Building (CIOB)**

*"In the face of the escalating climate crisis, the construction industry must do its part in the transition to a net-zero carbon economy. RICS is happy to support the Climate Framework as a shared understanding of the skills and knowledge required across disciplines to drive this transition."*

**Fabrizio Varriale, PhD, Place and Space Analyst, Royal Institution of Chartered Surveyors (RICS)**

# Academia

*"This cross industry Climate Framework is a hugely exciting and a major step forward in providing a truly comprehensive and inclusive knowledge resource to enable built environment professionals and academics to rapidly address the climate emergency we all face. This initiative is exemplary in demonstrating the need for a transdisciplinary approach which interweaves practice and academia. I hope all built environment education programmes will adopt this holistic framework to develop capable graduates who can meet this critical global challenge."*

**Professor Fionn Stevenson, Chair in Sustainable Design, The University of Sheffield School of Architecture**

*"If humans are going to have a chance of reducing the negative impact of the climate and ecological emergency, we will need to work intelligently, effectively, and crucially, collectively— sharing knowledge and expertise. Like many people I believe that we have no time to lose. With the construction industry pretty much responsible for 45% of all $CO_2$ emissions, consuming 50% of all mined and harvested raw materials, and creating over 60% of UK's annual waste (that's 120 million tonnes), we urgently need a well-informed route map that will help us steer a path towards a positive future where humans exist in harmony with the rest of our host planet. The Climate Framework is exactly what we need."*

**Duncan Baker-Brown, Climate Literacy Champion, School of Architecture and Design, University of Brighton & RIBA Council Member**

*"We have spent 270 years on the carbon-use upslope. We now have a decade or two to descend the downslope to the safety of the base camp. The skills, outlook and culture required for this entirely different challenge require a revolution in thinking. This initiative represents just that."*

**Professor Tim Ibell, Professor of Structural Engineering, Associate Dean of the Faculty of Engineering and Design, University of Bath**

*"The Climate Framework provides an excellent, comprehensive overview of the context and necessary initiatives to achieve sustainable design. It goes beyond the core concerns of energy and carbon to frame these within wider themes ranging from human behaviour to the circular economy. This rich and systematic framework will not only inform but also inspire design teams to develop creative and effective responses to the climate crisis."*

**Professor Koen Steemers, Professor of Sustainable Design, Department of Architecture, University of Cambridge**

*"Net zero" demands a transformation in the way we design and build. It depends on us all pushing the boundaries of our knowledge and skills, no matter what our career stage. This initiative, with input from across our industry, professional bodies and universities, will enable exactly that".*

**Dr Stephen Allen, Lecturer, Department of Architecture & Civil Engineering, University of Bath**

*"I am delighted that we have reached this point where both the built environment industry and academia have grasped the scale of the challenge and have stepped up to deal with it together. The Climate Framework provides a coherent educational pathway for both those already in the industry and those teaching the new generations coming into the profession, such as LSBU. It is to be applauded."*

**Professor Andy Ford, Professor of Systems in the Built Environment, The School of the Built Environment and Architecture, London South Bank University**

*"This framework is a significant step forward to capturing the extent to which the collaborative decisions of designers in the built environment can impact the future of our planet. The challenges we are facing are complex and cannot be surmounted without the strategic alignment and united progress(yes upskilling!) across the professions, education, and industry. Willingness to LEARN and SHARE our collective experience will determine our children's future."*

**Jennifer Boyer, Assistant Head of School, Dublin School of Architecture, TU Dublin**

*"We are delighted to support the Climate Framework which provides a cross-disciplinary holistic approach to grow climate change capability and capacity to a contribute to a sustainable global society. It is important that the built environment industry, providers and professional bodies collaborate to provide next generation education, training and development to ensure that students, graduates and existing professionals are gaining the relevant skills both now (and for the future). Sustainability and climate change is hugely important to us as custodians of an institution which trains professionals to go out and create a better built environment."*

**Aled Williams, Director of Research, Innovation and Partnerships, UCEM & CIC Champion, Education**

*"As someone who supported the Climate Framework from day one, I am truly excited to see it progressing to global visibility with such wide and shared consensus from both industry and academia. At a time where everybody talks about upskilling construction workers, very few seem to realise the at least equal importance of educating construction thinkers. The Climate Framework is a fundamental first step precisely in this direction."*

**Dr Francesco Pomponi, Head of REBEL (Resource Efficient Built Environment Lab), Edinburgh Napier University**

*"Widespread action in 2018/19 saw most UK Higher education institutions becoming signatories to Climate Emergency Declarations as well as the Sustainable Development Goals Accord. These actions require these centres of learning to deliver zero carbon in their own activities by 2030 and to embed sustainability and climate change agendas throughout their curricula. However, action on curriculum has been slow. I therefore wholeheartedly welcome and support the launch of the Cross-Industry Action Group for Education's Climate Framework. This initiative will enable schools of the built environment to deliver on their institutions commitments and enable their graduates to promote and deliver the change the industry so sorely needs."*

**Dr Julie Gwilliam, Reader Welsh School of Architecture, Dean of Postgraduate Studies College of Physical Sciences & Engineering, Associate Dean for Environmental Sustainability, Cardiff University**

*"I endorse the Climate Framework initiative and its ambition to provide common ground for a holistic, cross-disciplinary action for building a greater capacity around climate change and sustainability, embraced collectively by both industry and academia. Its introduction is very timely indeed, as critical and pressing challenges of the current pace of climate change, rapid world urbanisation and the need for better pandemic responsiveness require from each and every one of us to "up the game" in delivering our built environments in a more sustainable way."*

**Dr Boris Ceranic, Course Director for MSc Architectural Courses, University of Derby & CIAT Center of Excellence Leader**

*"As design professionals there has never been a greater need to reassess and reimagine our relationship with nature for a designed not necessarily only a built environment; The Climate Framework provides a much needed holistic knowledge base for further developing our collaborative, cross disciplinary and creative design practice for a climate-changed future".*

**Dr Sonja Dragojlovic-Oliveira, Programme Leader for B(Eng) Architecture and Environmental Engineering, Department of Architecture and the Built Environment Faculty of Environment and Technology, University of the West England Bristol**

*"I wholeheartedly support the Climate Framework Structure proposed by the Cross-industry Action Group whereby the industry and the academia will strongly collaborate to develop a robust, rich and holistic knowledge base on climate change mitigation and adaptation strategies. This is a very timely initiative to further enhance the commitment of the building industry to taking informed actions on reducing carbon emissions from the built environment and to conserve natural resources."*

**Dr Eshrar Latif, Associate Professor, Welsh School of Architecture, Cardiff university**

*"The design and management of our cities, our buildings, and the social and cultural conventions of daily life, significantly impact the long-term health and wellbeing of our planet, of humans and all living things. The Climate Framework makes an important contribution to strengthening climate awareness by tying together relevant scientific knowledge from diverse disciplines. It is a powerful platform for ensuring that educators, learners, designers and industry understand fully the ways in which their professional actions not only prevent damage but positively shape a sustainable environment."*

**Alexi Marmot, Professor Facility & Environment Management, UCL**

*"Embedding sustainability and climate contents in our programmes have been an objective for many years. The lack of coordinated effort to build up creditable contents has been an issue overdue. The Climate Framework is a well thought-out comprehensive approach for all higher education programmes to adopt for their course development."*

**Steve Austin, Head of School, Energy, Construction and Environment, Coventry University**

*"I am delighted to see this initiative systematising and integrating current and emerging knowledges about transitions to zero carbon and fairer built environments. This broad climate curriculum framework acknowledges the complexities and interdependencies and raises the bar of professional discourses, without shying away from responsibilities. I also welcome and applaud this initiative for its holistic approach to lifelong learning for built environment professionals, which recognises the role that universities and professional bodies can and should play in working together to encourage and support such learning."*

**Dr Cristina Cerulli, Associate Professor in Community-led Architecture and Urban Design, College of Social Sciences and Arts, Sheffield Hallam University**

*"The Climate Framework provides a holistic knowledge base to motivate current and future built environment professionals in learning technical knowledge and effective digital skills, exploring critical thinking and innovative solutions to benefit society. It will also set upskilling relay—challenge benchmarks to verify and validate the collective impacts from all sectors on net zero operational carbon, biodiversity net gain and transformation to a circular economy."*

**Dr Tong Yang, Senior Lecturer in Construction, Architecture & BIM, Middlesex University**

*"There has never been more pressing times for built environment professionals. Meeting the needs of our society whilst reducing our environmental impact will demand a paradigm shift in the way we commission, design, build and occupy our buildings and cities. We need to understand them as parts of a larger system, that needs to be self-sustaining and self-healing. In order to realise this, education and training will need to equip professionals with the skills and competences to rapidly - and confidently - decarbonise the built environment and increase its resilience. The Climate Framework proposition is to offer the foundations to enable this to happen."*

**Prof Lucelia Rodrigues, Chair in Sustainable & Resilient Cities, Department of Architecture & Built Environment, University of Nottingham**

*"The Climate Framework is indeed a timely initiative as the UK and other governments commit to net-zero emissions by 2050, endorsed by multiple key stakeholders within the construction industry; with academia and research as the backbone for achieving this mission. I am very pleased to support the Climate Framework as I am passionate about embedding sustainable and low/zero carbon design strategies in teaching, as well as a consistent theme in my research. At UEL, we have recently introduced 3 new modules (20 credits at each level of BSc (Hons) Architecture) which focus on the integration of environmental design from the outset of a project, building students' ability to reflect on appropriate zero carbon design strategies and explore them in a creative and rigorous manner within their design projects. I am confident the Climate Framework will effectively develop and sustain the 'golden thread of knowledge' it aspires to create throughout a practitioner's journey from a student to a professional - genuinely competent in addressing the climate emergency."*

**Dr Heba Elsharkawy, Reader in Architecture, Course Leader BSc (Hons) Architecture (ARB/RIBA Part 1), University of East London**

*"The climate crisis challenges every discipline working to develop our built environment and requires that we fundamentally reconsider how we build for our future. The Climate Framework will ensure that our future built environment professionals are equipped with the knowledge and skills needed to build today and ensure we protect our future."*

**Dr Ian Hamilton, Associate Professor, UCL Energy Institute, University College London**

*"The Manchester School of Architecture is delighted to support the Climate Framework, particularly the holistic focus it will bring to educating our future graduates to address the climate emergency. We welcome the attention paid to climate justice and inclusivity, and we are encouraged by the interaction with climate adaptation and the biodiversity crisis. We look forward to incorporating such a valuable tool into our existing academic courses."*

**Dr Angela Connelly, Senior Lecturer and Climate Change Advocate, Manchester School of Architecture**

*"The contribution of buildings to greenhouse gas emissions in Cape Town is more than the global average. The 2018 spectre of 'day-zero', when Cape Town would run out of water, heralded an existential threat. Cape Town is a highly unequal city in a unique floral kingdom. The School of Architecture at the University of Cape Town endeavours to equip students with the skillsets to engage with these urgent ecological and social challenges. We value and support the Climate Framework in its aim to educate well-rounded built environment professionals to play a leading part in interdisciplinary efforts for global sustainability."*

**Dr Tom Sanya, Senior Lecturer & Dr Philippa Tumubweinee, Director, School of Architecture, Planning and Geomatics, University of Cape Town**

*"The AED initiative arose due to the significant lack of pedagogical training regarding the climate and ecological crisis in architectural education. We therefore welcome and applaud this effort made towards the remediation of such a deficit, and believe the framework will hold a crucial role in equipping us with the knowledge and skills necessary to make a meaningful contribution over these next vital years."*

**Architecture Education Declares**

*"An industry wide climate framework, I believe, would allow us to establish a culture of partnership between research, education and practice. Currently these three areas are not well-linked, but strengthening and formalising the links is essential if the built environment sector is to acquire the capacity to innovate. The latter include the capacity of all related professions to develop new working practices, acquire new knowledge and also to make architectural projects arenas for shared research and learning. Hitherto the opportunities for such collaboration have not been harnessed well and establishing a climate framework would be an important step towards achieving that goal."*

**Professor Henrik Schoenefeldt, Professor of Sustainability in Architectural Heritage, School of Architecture, University of Kent**

*"Humankind has been using the natural capital of the Earth at an increasingly alarming rate, seemingly unaware of the consequences until recently. With such large increases in populations envisaged in this century, societies have to question, for example, the problem of production and begin to discover new life styles for living which are less consumptive and have much less impact on the natural environment if a viable balance between people and the Earth is going to endure. We need to learn lessons from how Nature optimises material and energy usage. We can only do this by a holistic and transdisciplinary approach—which is embedded in the Climate Framework—so in this way the barriers which too often impede the flow of knowledge are dissolved."*

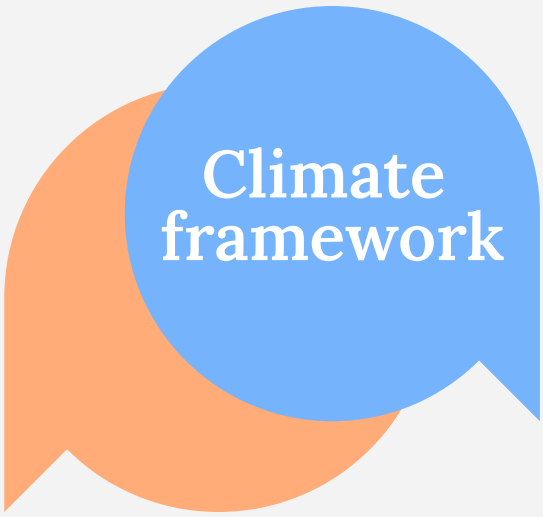
**Professor Emeritus Derek Clements-Croome, University of Reading**

*"Industry and academia should work together collaboratively and urgently on reducing greenhouse gas emissions from construction and the built environment."*

**Dr Alice Moncaster, Senior Lecturer, School of Engineering and Innovation, The Open University**

*"The Climate Framework offers a compelling methodology for connecting schools to professional practice, breaches the void left by a lack of dynamic construction industry standards and a curricula shortfall in need of a stronger mandate from the accreditation boards, and ensures students and architects can respond effectively and immediately to the deepening climate crisis."*

**Dr Harriet Harriss, Dean, Pratt Institute School of Architecture**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