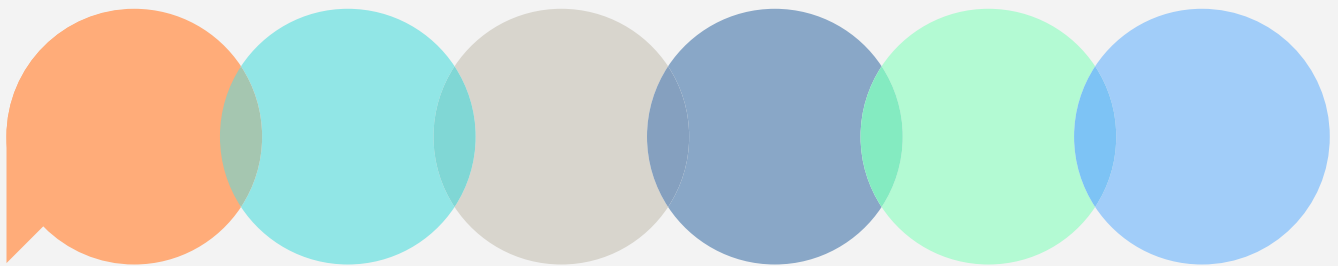


Climate Framework[®]



A cross-industry
action group initiative

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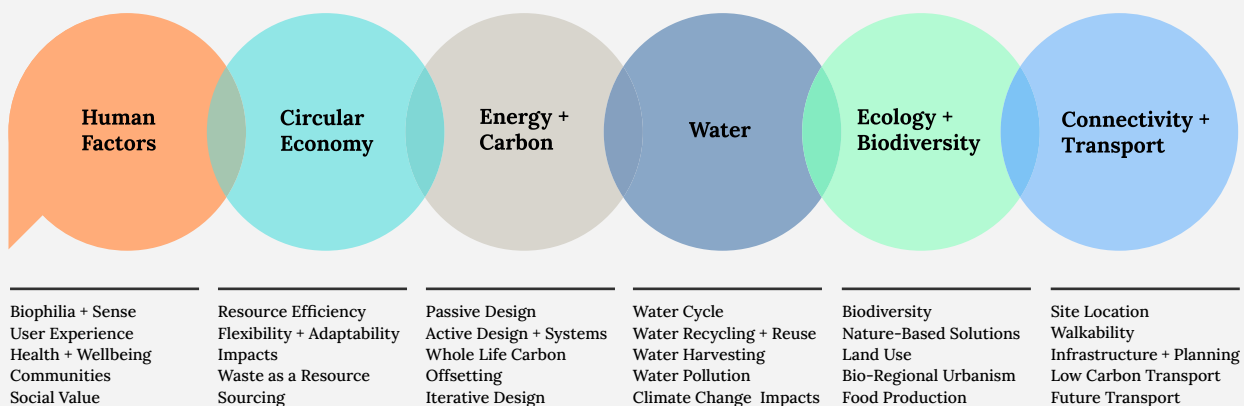
Detailed Framework Structure

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 in order to halt climate change, and mitigate its impacts.

Global Context + Fundamentals

Built Environment Context

Common Threads



Context

1 Introduction [to the Climate Framework]

Purpose

Audience/Reader

Learning Objectives/Outcomes/Standards

[Framework] Structure

Terminology

2 Global Context and Fundamentals

Climate Fundamentals

- Climate Change
 - Scientific Evidence
 - Key Indicators
 - Key Contributors
 - Projected Physical Impacts and Regional Priorities
 - Psychological Impacts
- Resource Use
 - Current Trends and Future Prospects of Natural Resources
 - Socio-economic Implications of Irresponsible Resource Use
 - Resources Efficiency and Climate Change
 - Sustainable Resource Management
 - Shifts in Global Land Use, Migration and Conflict
- Systems Thinking
 - Measurable Changes in Earth’s Systems and Processes
 - Causes and Effects of Global Changes
 - Socio-economic Drivers and Economic Consequences
 - Risk and Resilience
 - Regenerative Leadership

International Policy, Legislation, Agreements and Plans for Action

- United Nations Framework Convention on Climate Change and The Kyoto Protocol
- United Nations Agenda 2030: Sustainable Development Goals, Global Indicator Framework for SDGs and Targets of the 2030 Agenda
- The Paris Agreement
- Sendai Framework for Disaster Risk Reduction
- Nature Action Agenda

Risks & Opportunities in a Net Zero Economy

- Climate Change Risk Management and Nature Economy
- Physical Risks (Stranded Assets), Opportunities and Actions
- Transition Risks (Renewable Energy Technology Developments)
- Global Institution/Sector Economy
- Low Carbon Economy

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



Context (continued)

3 Built Environment Context

Environmental Impacts of the Built Environment

- Sustainable Consumption and Production, Scale and Balance
- Impacts on the External Environment (Land Use, Pollution, Other Greenhouse Gases)
- Impacts on the Internal Environment (Energy and Water Use, Waste, Thermal Efficiency)
- 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 Future Generations
- Supply and Value Chains

Sustainable Urbanism, Architecture and Engineering

- Vernacular Design
- 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 and Growth

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

- Policies, Legislation, Regulations and Carbon Budgets
- Overview of (Key) Existing Guidance and Targets (RIBA, AIA, LETI, UKGBC, WorldGBC, CIBSE, RICS, BBP, etc.)
- Overview of (Key) Existing Standards (ISO, CEN, etc.)
- Other Mechanisms for Change (Certifications such as BREEAM, LEED, WELL, NABERS, One Planet Living, Living Building Challenge, Swan Ecolabel and Declarations, etc.)
- Advocacy, Co-production and Policy Making

Construction and Real Estate Industry

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

This section covers built environment's impact on people, natural systems, and presents global policies, standards...



Context (continued)

4 Common Threads

Retrofit (Adaptation and Reuse)

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

Climate Justice, Equitable and Inclusive Design

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

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), Wildfires, Sea Level Rises, Increased Precipitation, Storms, Floods, Droughts, etc.)
- Vulnerability (Exposure and Sensitivity) and Adaptive Capacity
- Proactive Adaptation
- Reactive Adaptation
- Stakeholders and Participation

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

Process, Investment and Procurement

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

This section covers crucial topics that are applicable to all the overarching, six 'outcomes' topics of the Framework.



Context (continued)

4 Common Threads

Stakeholder Engagement

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

Research, Innovation and Partnerships

- Research-based Design
- "Inter-professionalism": Interdisciplinary and Transdisciplinary Approach
- Future Scenarios: Benchmarking and Analysis through Digital Innovation
- Urban Governance
- International/Regional Agency, Institutions and Partnerships

This section's topics are referenced, with a focused emphasis, under each, six 'outcomes' topic...



Outcomes

1 Human Factors

Introduction and Core Principles

Biophilic and Sensory Design

- Place-based and Human–Nature Relationships
- Environmental Features (Air, Water, Habitats, etc.), and Sensory Stimuli (Physiological and Physical Factors)
- Natural Forms and Shapes (Biomimicry, Biomorphy, etc.)
- Natural Patterns, Processes and Systems (Materials, Textures, etc.)
- Light and Space

User Experience Design and Occupancy Behavior/Control

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

[Physical] Health, [Mental] Wellbeing and Comfort

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

Communities, Interconnectivity and Inclusion

- Healthy Placemaking, Community Building and Identity
- Accessibility Mapping
- Inclusion Mapping
- Scenario–based Design (Current Context, Designed Context and Altered Context)
- Just Transition

Social Value

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

Resources (Tools and Guides)

Case Studies

This section covers topics in relation to people; health + wellbeing, behaviour, and social value...



Outcomes (continued)

2 Circular Economy

Introduction and Core Principles

Resource Efficiency and Geographic Implications

- Natural Capital and Nature Ecosystem Parallel
- The Four R's: Reduce, Reuse, (Repair &) Repurpose, Recycle
- Choice of Construction/Materials and Technology
- Waste Sources and Reduction
- Urban Systems and Circularity

Designing for Change (Flexibility and Adaptability), Redundancy and Regeneration

- Designing for Inner Loops
- Designing for Prefabrication, Manufacturing, Cradle-to-Cradle, Disassembly/Demolition and Reassembly
- Designing for Flexibility [for Change of Space within the Same Use]
- Designing for Future Adaptability (for a Change of Use) and Durability
- Designing for Temporariness: From Products to Services

Environmental and Health Impacts of Materials and Waste

- Carbon: Low Carbon Materials (Reclaimed, with High Recycled Content, Bio-based, etc.)
- Waste: Hazardous and Non-hazardous Waste
- Pollution: Air and Water
- Chemical Content, Emissions and Pollution
- Material and Product Declarations/Certifications/Disclosure (EPD, HPD, C2C, etc.)

Waste as a Resource

- Waste Sources [within the Built Environment]: Energy, Liquids, Materials/Products, Organic/Food, Nature
- Waste-to-Energy
- Waste-to-Product/Material (Recycling: Upcycling and Downcycling)
- Waste-to-'Food' (Composting)
- Waste-to-Nature (Biodegraded Trees, Plants, etc.)

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

Resources (Calculations, Tools, Databases and Guides)

Case Studies

This section focuses on resources, their use, maintenance, and procurement to encourage 'endless recycling/reuse'.



Outcomes (continued)

3 Energy and Carbon

Introduction and Core Principles

Passive Design

- Climate and Microclimate
- Building Orientation, Form 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 (Load) Sharing and District Networks
- Smart Systems, Technologies 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

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

Operational Energy Modelling, Embodied Carbon Assessment and Iterative Design Process

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

Resources (Methodologies, Tools, Databases and Guides)

Case Studies

This section covers energy use, and carbon emissions' reduction, as well as offsetting in the built environment.



Outcomes (continued)

4 Water

Introduction and Core Principles

Water Cycle, Demand, Supply, Reduction and Management

- Urban vs. Rural Water Cycle
- Indoor Water Sources and Use (inc. Process Water)
- Outdoor Water Sources and Use
- Freshwater Withdrawals
- Water Distribution and Management

Water Recycle and Reuse

- Wastewater Sources
- Water Collection and Storage
- Wastewater Treatment and Reuse
- Environmental, Social and Economic Implications
- Technological Advancements

Rainwater Harvesting, Stormwater Management and Sustainable Urban Drainage

- Causes and Effects on Water Quality and Quantity
- Benefits: Surface Water as a Resource
- Rainwater Use
- Catchment and Storage
- Sustainable Urban Drainage Systems (SUDs)

Water Pollution on Land and in (Natural) Aquatic Habitats

- Causes and Effects
- Water Pollution Sources
- Water Pollution Measurement
- Water Pollution Control
- Water Pollution Prevention

Climate Change Impacts (Floods, Droughts, Water Quality)

- Climate Change Impacts on People and Nature (Lakes, Coastal Wetlands, Aquifers, etc.) and Cascading Events
- Designing for Water Scarcity
- Designing for Intense Rainfall, Storms and Wind Damage
- Designing for Sea Level Rise and Flood Risk
- Adaptation Opportunities and Challenges [to reducing Vulnerabilities]

Resources (Calculators, Tools and Guides)

Case Studies

This section focuses on water use, harvesting and recycling, as well as climate change's impact on natural water bodies



Outcomes (continued)

5 Ecology and Biodiversity

Introduction and Core Principles

Biodiversity and Net Gain

- Habitat Evaluation: Factors, Risks, Pre- and Post-Development Conditions
- Mitigation Hierarchy and Multi-layered Outcomes
- Key Actors
- Measurement and Monitoring
- Offsetting Net [Biodiversity] Loss

Nature-based Solutions

- Benefits and Unwanted Impacts
- Societal Challenges
- Ecosystem Services' Design at Scale
- Balance
- Adaptive Management

Land Use and Building Density

- Pressures (Environmental, Socio-economic, Cultural), Demand (Human Needs) and Supply (Natural Capital and Sources)
- Compact Development
- Mixed-use Development
- Transit-oriented Development
- Open Space and Pedestrian-oriented Development

Bio-regional Urbanism and Design

- Action-oriented Planning
- Place-based Design
- Liveable Built Environment
- Green Regionalism and Infrastructures
- Responsible Regionalism

Urban Farming and Sustainable Food Production

- Benefits: Health, Environmental, Social, and Economic
- Challenges: Resource and Energy Efficiency
- Farming Methods
- Productive Landscapes: Urban, Rural and Peri-Urban Farms
- Building-integrated Solutions

Resources (Tools and Guides)

Case Studies

This section covers efficient land use, nature-based solutions, and sustainable food production, among others...



Outcomes (continued)

6 Connectivity and Transport

Introduction and Core Principles

Site (Selection and) Location

- 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
- 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 & 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
- Electric Vehicles and Charging Infrastructure
- Car Sharing
- Autonomous Vehicles

Planning for Future of Transportation

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

Resources (Calculators, Tools and Guides)

Case Studies

This section focuses on how people, places, and cities connect through sustainable urban planning, and transportation.





Climate
framework