

Building for the Future

A Knowledge Product Collection
by Bauhaus Earth

3

Series 1 — Setting the Frame

The Vision of a Regenerative Built Environment



Supported by:



What to Expect:

Calls for a systemic transformation of our built environment have been growing in recent years. However, the question remains - in which direction do we want this change to take us, and what is our ultimate vision?

Merely aiming for minimal harm, as sustainability implies, is no longer enough. The damage to our natural systems has already been done. We must raise the bar. This third Knowledge Product in Series 1 “Setting the Frame” introduces the concept of a regenerative built environment. Learn about a holistic framework that can guide transformation towards a climate-positive and inclusive future within planetary boundaries.

From ‘Sustainable’ to ‘Regenerative’: Why a Paradigm Shift is Needed

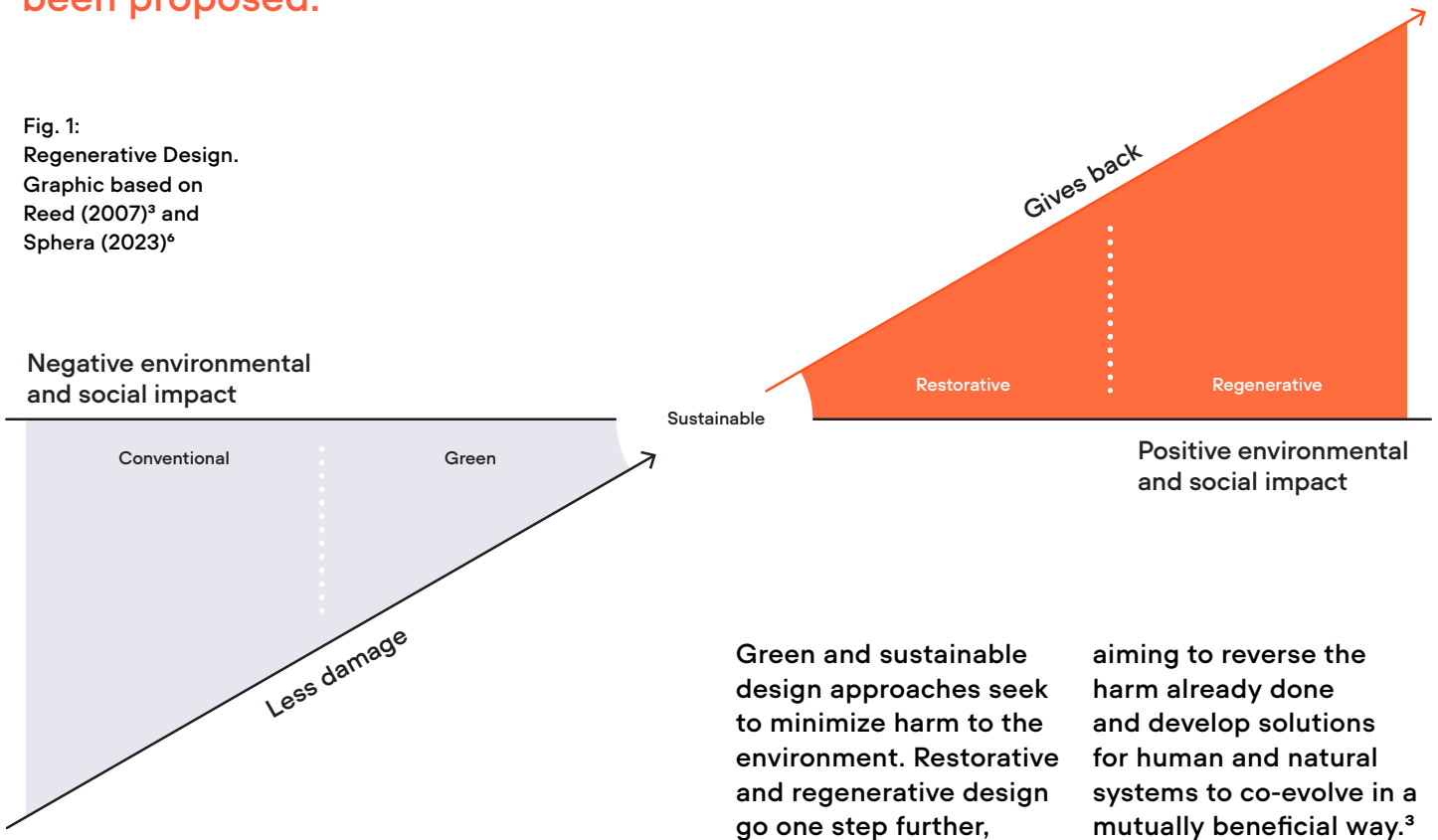
For more than three decades, the concept of ‘sustainability’ or ‘sustainable development’ has been the dominant paradigm for addressing environmental and social issues. The 1987 Brundtland Report was instrumental in popularizing the concept, defining sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”¹.

This definition has often been translated into policies, programmes, and legislation that focus on increasing efficiency and reducing harm². In recent years, however, the concept of sustainability has come under increasing criticism. Given the current climate and biodiversity crises³, and the damage that has already been done to the Earth’s natural systems, the goal of avoiding future destruction is simply no longer sufficient.

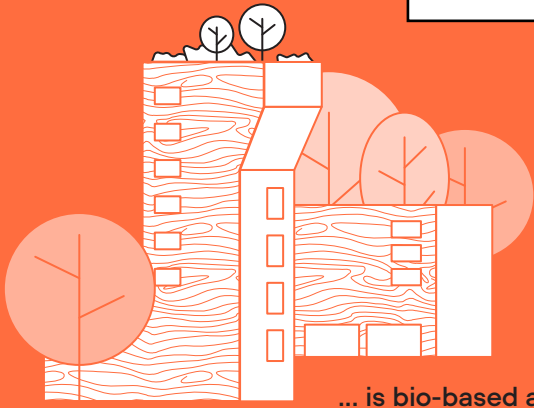
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To bring about
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Therefore, to bring about a new paradigm shift, the idea of 'regenerative development'⁴ has been proposed. This concept advocates for practices that not only reverse the damage already done but also replenish our natural ecosystems⁵. For example, by expanding our natural carbon sinks like forests and wetlands. Central to the concept of 'regenerative development' is the objective of breaking down the dualism between human and nature, or city and rural areas, and developing ways in which the two can be re-entangled and co-evolve in a mutually beneficial relationship⁵.

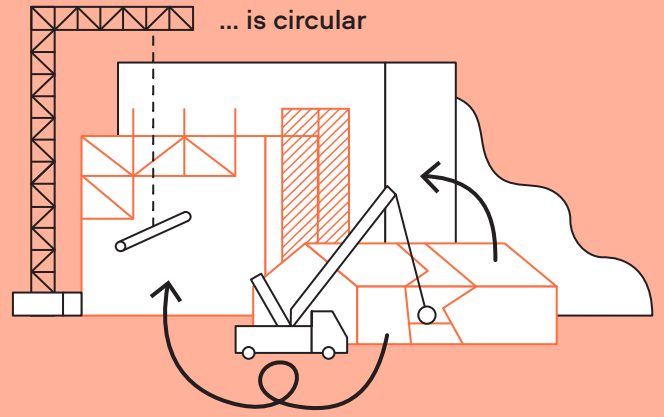
Fig. 1:
Regenerative Design.
Graphic based on
Reed (2007)³ and
Sphera (2023)⁶



A regenerative built environment ...

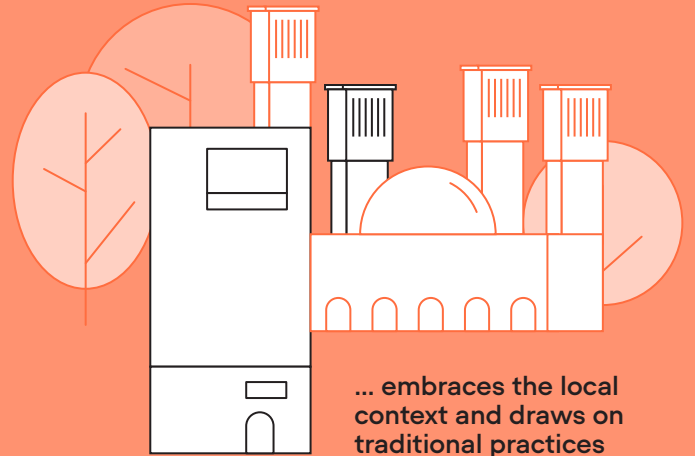
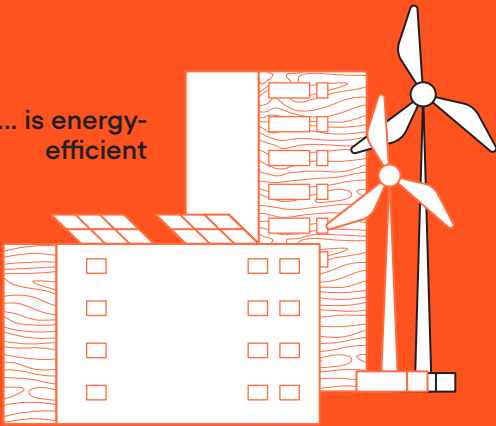


... is bio-based and climate-positive



... is circular

... is energy-efficient



... embraces the local context and draws on traditional practices

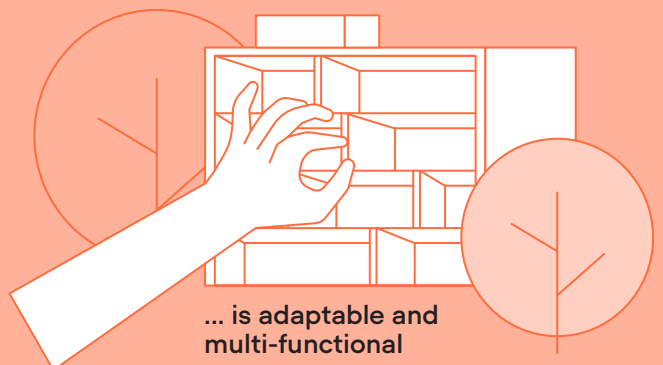


... is healthy, and green, and infused with nature

... is inclusive, and cohesive



... is polycentric, compact, and mixed-use

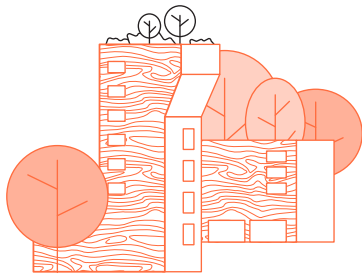


... is adaptable and multi-functional

Applying the Concept of 'Regeneration' to the Built Environment: Core Principles and Values

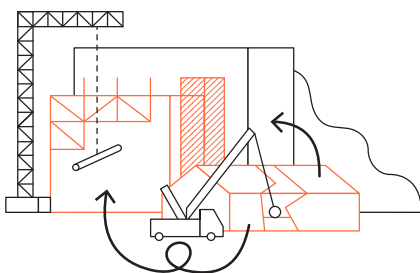
The concept of a 'regenerative built environment' provides a holistic framework to facilitate thinking and action that can have a net positive impact on our social and natural systems². The following eight principles and values can guide the design, planning, and (re)construction of buildings and infrastructure and demonstrate the different facets of what contributes to and defines a regenerative built environment.

Fig. 2-9:
Overview of the
principles of a
regenerative built
environment

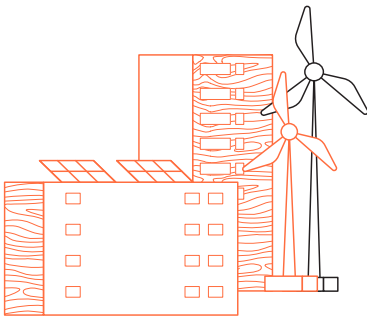


A regenerative built environment ...

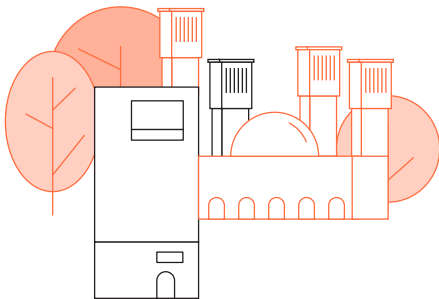
... is bio-based and climate-positive. Wherever possible, sustainably sourced bio-based materials such as wood, hemp, straw, or bamboo are used in the construction of new buildings and in the retrofitting and refurbishment of existing buildings. Replacing carbon-intensive building materials such as cement or steel with bio-based materials can not only reduce greenhouse gas emissions, but also store the carbon dioxide that is removed from the atmosphere as trees or plants grow. In this way, bio-based buildings and cities can become artificial carbon sinks, helping to limit global warming to below 2°C⁷.



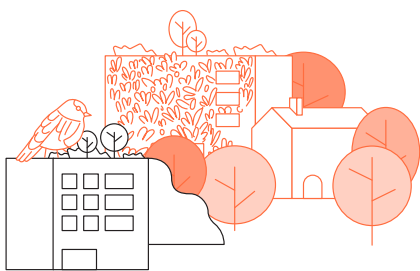
... is circular. To achieve circularity, the linear use of building materials, based on material extraction, use, and disposal, is replaced with practices that extend the life cycle of building materials, ensuring they remain in circulation for as long as possible. New buildings are designed so that individual components can be easily removed and reused, while materials from the existing building stock are recovered, repaired, or recycled. Recycling and reusing not only reduces waste, but also minimizes the need for raw materials – a necessity in times of resource scarcity⁸.



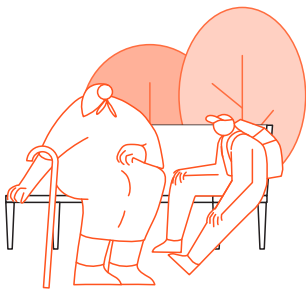
... is energy-efficient. The transition to a positive energy building stock can be achieved by powering buildings with renewable energy sources such as solar and wind, minimizing their overall energy demand through optimized building envelopes, and using technologies such as photovoltaics (PV) that enable buildings to produce more energy than they consume. Positive energy buildings are more resource-efficient, help reduce operational emissions, and can subsidize more energy intensive sectors, while increasing the comfort and economic viability of the building over its life cycle⁹.



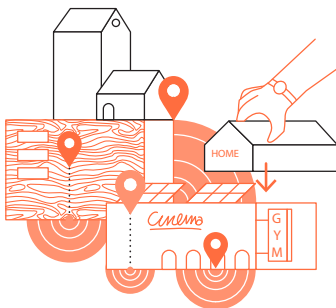
... embraces the local context and draws on traditional practices. Rather than producing buildings that all look the same and have little local identity, architectural design draws on traditional building methods and local building culture, and embraces different forms of knowledge, while satisfying the desire for modernity and the need for urban density. The result is buildings and cities that are deeply rooted in their environmental and socio-cultural context and unique in their structure, organization, and use of locally available building materials¹⁰.



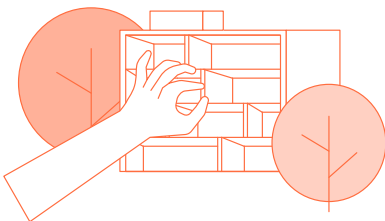
... is healthy, green, and infused with nature. Nature-based solutions and green infrastructure, such as green walls, green roofs, rain gardens, trees, or green spaces, are incorporated into existing or new buildings and infrastructure. In addition to sequestering carbon and acting as a natural carbon sink, nature-based solutions provide numerous socio-economic and health benefits, such as improving air quality and the local microclimate, reducing stress and, when designed as public spaces, creating a high quality of life. Green roofs and walls also help to mitigate the heat island effect and regulate the building envelope, resulting in reduced building energy use and therefore reduced operational emissions¹¹.



... is inclusive and cohesive. Buildings and infrastructure no longer serve a select few but respond to the needs of a broad spectrum of society - especially vulnerable and marginalized groups - and have a positive impact on the social fabric. This requires the provision of affordable, safe, and accessible housing, equal access to basic services, and safe public spaces that facilitate social interaction and participation. Reconciling social and equity issues with the transition to a bio-based built environment allows for the creation of a more sustainable, and human-centred urban environment.



... is polycentric, compact, and mixed-use. Neighbourhoods and cities are planned and (re)designed so that basic urban services such as work, education, health, culture, leisure, and housing are accessible in close proximity. Emphasis is placed on ensuring walkability, cycleability, safe and inclusive public spaces, and access to public transport. This improves quality of life and social cohesion, while reducing demand for energy, resources, and (transport) infrastructure¹².



... is adaptable and multi-functional. Buildings and infrastructure are designed to be as flexible and adaptable as possible. This maximizes their potential to respond to societal changes and technological advances that will significantly alter the demands on buildings and their use. Wherever possible, multifunctional spaces are created that integrate different functions in time and space. The ease with which buildings and spaces can be adapted to changing needs and uses helps to increase building occupancy and street vibrancy, extend the building's life span, and reduce costs over its life cycle¹³.

To what extent have you considered the principles of a regenerative built environment?

My project is...

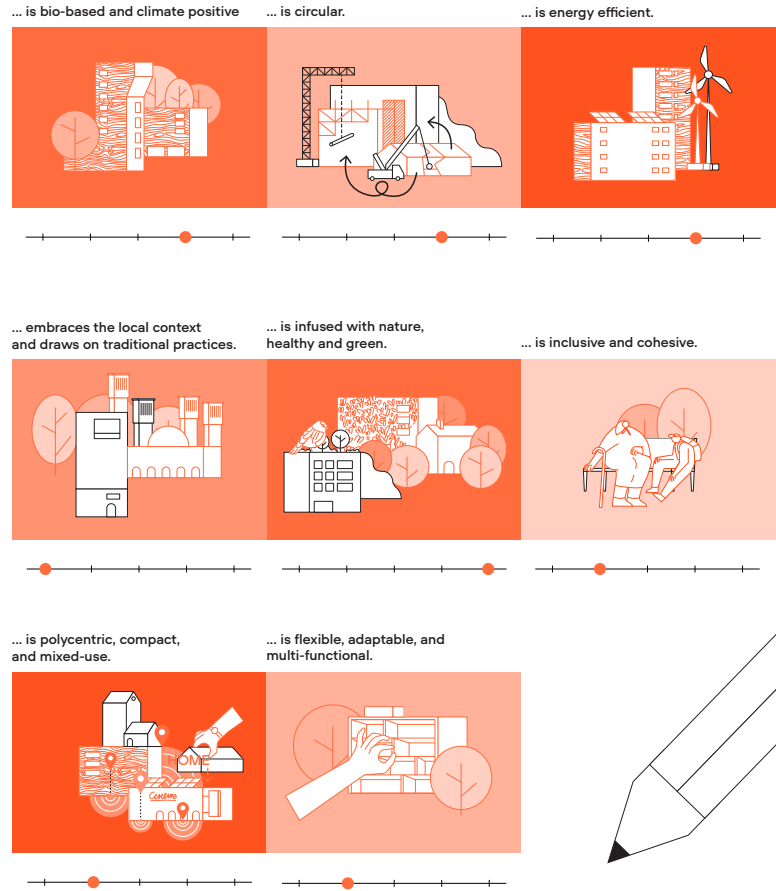


Fig. 10:
Assessing projects against the principles of a regenerative built environment

These principles and values can be used to assess the extent to which a project contributes to the vision of a regenerative built environment.

Realizing the Concept of a Regenerative Built Environment: Cross-Cutting Approaches

Realizing the vision of a regenerative future requires new approaches to the way we plan, build, and govern the built environment. This means that buildings, neighbourhoods, and cities cannot be considered in isolation from the natural landscapes that surround and permeate them, but that urban and natural landscapes must be designed and transformed together to benefit both people and the planet.

The following strategies and cross-cutting approaches can help us achieve a regenerative built environment.

Cooperative Governance

Examples:
Regional inter-municipal networks; Bio-based supply chain planning frameworks (e.g. Forest to Frame platform connecting wood product consumers within the building industry with suppliers)

Agricultural and natural landscapes, including (bamboo) forests, extend beyond municipal boundaries. Accordingly, the sourcing, processing, manufacturing, and use of regionally sourced bio-based building materials such as wood and bamboo, or agricultural waste products such as straw, will often take place in different administrative jurisdictions. Strong spatial planning frameworks for integrated bio-based value chains and new forms of inter-municipal governance within a city region will be needed to ensure a sustainable transition to a bio-based built environment.

Interdisciplinary Multi-Stakeholder Collaboration

Examples:
Value chain engagement/partnership forums; Built Environment Futurecasting series

Putting the construction sector on a regenerative path requires the collective intelligence and concerted effort of all key actors in the system. It is imperative to bring them together to create a shared vision of what a more sustainable construction sector can look like and, more importantly, how it can be realized. This includes identifying barriers, intervention points, and the responsibilities of stakeholders. The growing demand for bio-based materials in the built environment will have implications for land use and forestry, requiring a careful balance between supply and demand. To achieve this, relevant actors and disciplines along the value chain – from forestry and manufacturing to architecture and planning – must collaborate closely to gain a better understanding of each other's roles in promoting regenerative practices in the industry.

Examples:
Experimental building classification (Gebäudeklasse E, Germany); Urban Living Labs; International Building Exhibition (Internationale Bauausstellung, Germany)

Examples:
City Forums, growing interactive exhibitions, small scale interventions, participatory experimental building projects

Experimentation

The building industry has been slow to respond to pressing challenges such as climate change, due to complex permitting and certification processes and the long-term nature of building construction and use. To accelerate the adoption of regenerative building practices, it is imperative to experiment with new approaches in real-world environments that are outside the established restrictive system. This can be achieved by introducing policies and procurement that facilitate the use of novel products and technologies, or by providing a spatial and temporal framework for testing innovative solutions on site.

Participation and Engagement

The built environment is our very own living space - making it more climate-friendly and inclusive will only be successful if people's needs, concerns, and ideas are taken seriously. This requires open spaces to discuss and co-create alternative futures. Targeted participatory actions are effective in understanding people's different needs, involving them in design and decision-making processes, and creating a shared understanding of the challenges ahead. These actions can include a variety of formats tailored to the knowledge and skills of different groups, enabling them to experience change at a small scale, make informed decisions, and take action.

“

While sustainability focuses on reducing harm and preserving the planetary resources, a regenerative approach goes further by actively restoring and replenishing natural systems.”

From Regenerative Buildings to Regenerative Cities and Regions

We must move beyond sustainability and embrace a regenerative mindset if we hope to truly transform the built environment. While sustainability focuses on reducing harm and preserving the planetary resources, a regenerative approach goes further by actively restoring and replenishing natural systems.

To achieve this, eight principles and values can guide the design, planning, and construction of buildings and infrastructure. This paradigm shift requires cross-cutting approaches that view buildings, neighbourhoods, and cities in relation to each other and the natural landscapes around them.

To further understand how the concept of a regenerative built environment can be operationalized and implemented in practice, it is helpful to unpack the concept by looking at three different scales.

- The scale of regenerative buildings
- The scale of regenerative neighbourhoods and cities
- The scale of regenerative regions

Each scale reveals new interrelationships that require a unique set of strategies and approaches. In our upcoming Knowledge Products, we will explore these scales in greater detail, beginning with the scale of buildings in Series 2 “Regenerative Buildings”

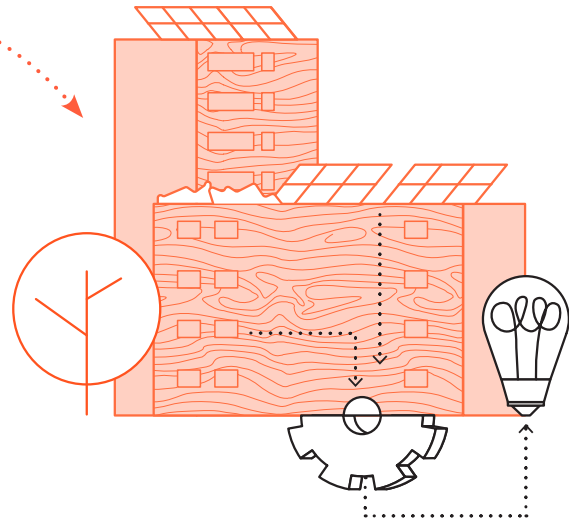
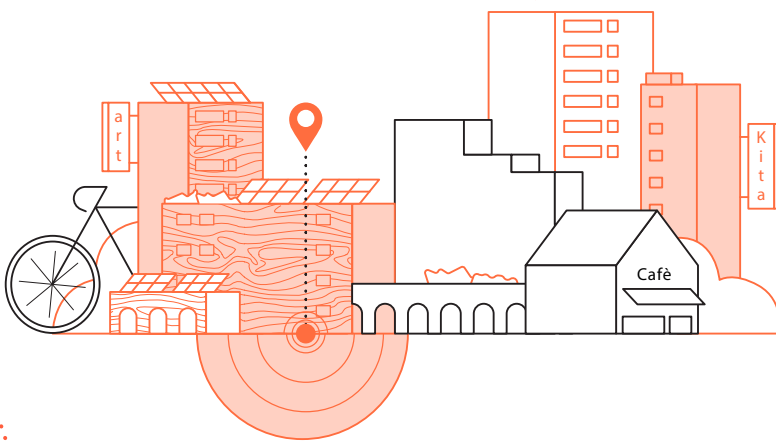


Fig. 11-13: Regenerative buildings, regenerative neighbourhoods and cities, and regenerative regions.



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About Bauhaus Earth

We envision a future where buildings, cities, and landscapes proactively contribute to climate restoration and have a positive impact on the planet and its inhabitants. Our mission is to transform building and human settlements from a driver of climate and societal crises into creative forces for systemic regeneration. Only a complete

systemic overhaul of our built environment will prevent a global climate catastrophe.

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