

D.1.4.1 – BAUHALPS Model



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BAUHALPS

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EXECUTIVE SUMMARY

BAUHALPS, part of the Interreg Alpine Space programme, aims to catalyse the circular transformation of the Alpine built environment by treating the participating regions as real-life laboratories. The BAUHALPS model serves as an interpretative framework for guiding the activities and outcomes of the BAUHALPS project. It integrates a set of defining concepts that shape the project's vision for circular transformation in the Alpine built environment. By mobilising local knowledge and resources, BAUHALPS positions circular architecture as very much a cultural project, fostering innovation that aligns technological feasibility with identity, beauty, and social equity for a sustainable Alpine future. Structured around five conceptual lenses – circularity, NEB values and working principles, genius loci, domains of innovation, and communities of inquiry – it provides a holistic approach to developing and evaluating regenerative systems.

The document begins with an introduction to the BAUHALPS vision and clarifies the purpose of the model as a guiding lens for project activities. It then outlines the conceptual foundations across several layers: circular building principles, the values and working methods of the New European Bauhaus, the Genius Loci repertoire, domains of innovation, and the role of communities of inquiry. A subsequent section translates these ideas into an operational framework for a circularity maturity assessment tool, linking abstract concepts to measurable indicators. The report concludes by highlighting the model's contribution to fostering regenerative, place-sensitive development in the Alpine region.



1. Introduction

Introduction to BAUHALPS

Aim of the Model

¹ *Interreg is the EU's programme for strengthening cohesion between regions through European Territorial Cooperation. It operates through four action areas: cross-border cooperation (A) for neighbouring regions, transnational cooperation (B) in larger areas like the Alpine Space, interregional cooperation (C) for knowledge exchange, and outermost regions (D). Since 2000, the Interreg Alpine Space Programme has united seven countries to tackle shared challenges and improve life for 80 million people. In 2021–2027, with €1.466 billion EU funding, Interreg drives the transition toward a carbon-neutral, climate-resilient Alpine region.*



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BAUHALPS aspires to catalyse the circular transformation of the built environment in the Alps. It does so by conceiving the region as a real-life-laboratory that invites to study in situ the development of circular building systems, emphasising the role of local communities and resources as well as new forms of collaboration and intervention across the construction value chain. The project ties in with the New European Bauhaus initiative in that it pursues the establishment of circularity and transitioning towards a sustainable future as an immanently cultural rather than exclusively technological project.

Challenged by its landscape, the inhabitants of the Alps have developed a unique repertoire of knowledge, skills, competences, experiences and problem-solving strategies manifest in their architecture, woodworks, literature, music and other cultural artefacts. It is these resources and people's ability to engage with the materials at

“... the inhabitants of the Alps have developed a unique repertoire of knowledge, skills, competences, experiences and problem-solving strategies [...]. It is these resources and people's ability to engage with the materials at hand that are sought to be mobilised and systematised in the realisation of new type of alpine building and construction around the concept of circularity.”

hand that are sought to be mobilised and systematised in the realisation of new type of alpine building and construction around the concept of circularity; a new type in correspondence with both the natural and cultural environment of the Alps and driven by the powers of technology, architecture, design, crafts and the creative milieu. The circular alpine architecture is thus conceived as transdisciplinary mission that integrates the rich body of cultivated knowledge with radically new insights, approaches and practices in order to ensure technical feasibility, agency and social acceptance.

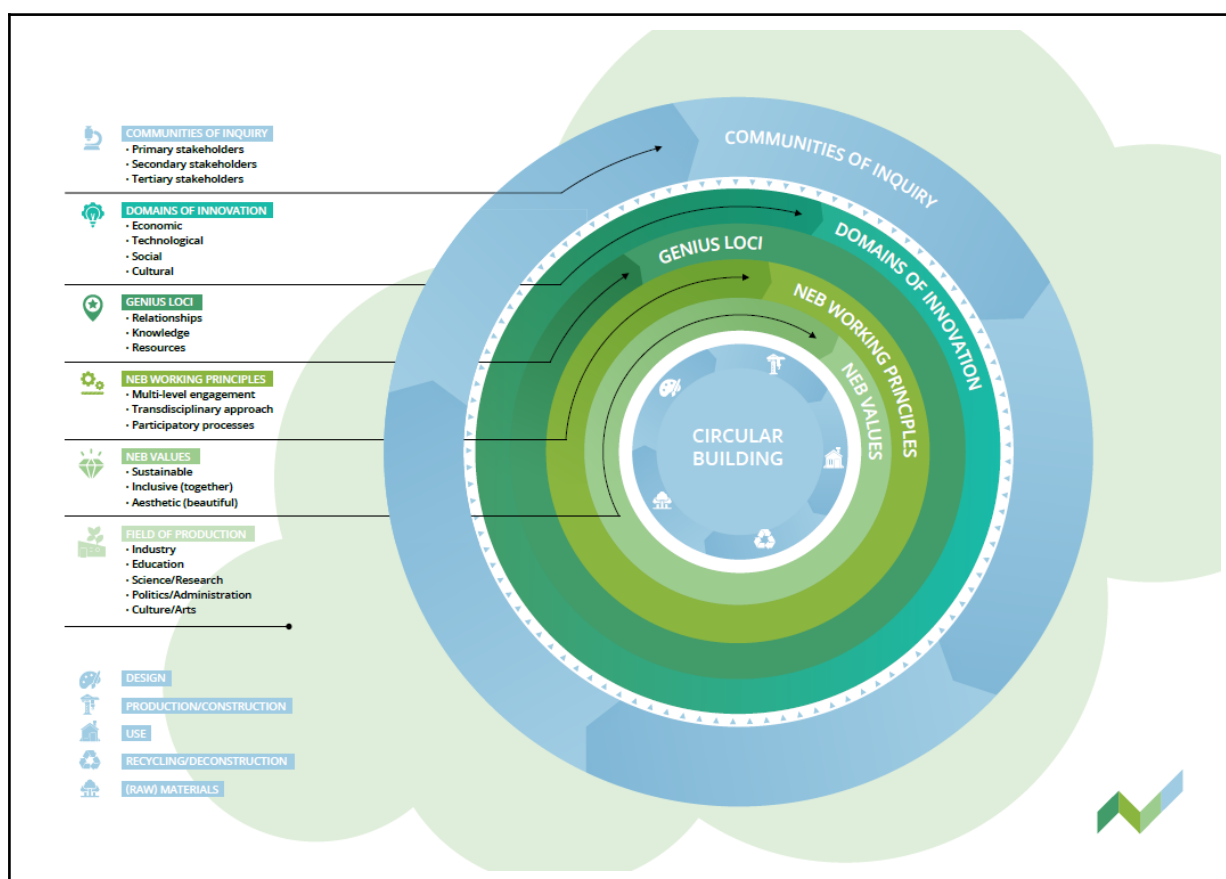
At its heart, BAUHALPS will develop and test new approaches for a greener building sector in the Alps, leveraging technological advancements and aesthetic qualities, and devising new standards for mandatory evaluations. The underlying model sets out to break professional silos and path dependencies, nurture close collaboration between regions, sectors and functions, form new alliances between arts and science, technology and culture, change the way experimental processes are administered and confront the realisation of the European Green Deal with a collective sense of urgency.



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The BAUHALPS model brings together seven conceptual layers as depicted in Figure 1 that indicate both the intellectual and practical scope of this project and inform the activities pursued within. Central to the model is the concept of the Genius Loci in that it provides the specific context, within which the building project is realised. It is the Genius Loci which brings the model down to the very location and building project it is applied and makes it distinct. In the following sections, the individual lenses will be explained and in the case of the NEB values and working principles operationalised to fit the needs of the BAUHALPS circularity maturity assessment tool.

Figure 1: BAUHALPS Model



2. Conceptual Lenses

Circular Building

BAUHALPS centres around the concept of circularity and the advancement of circular building systems. Placed at the heart of the model therefore is a concept of circularity that – in order to ensure consistency with the European discourse – is adapted from the European Environment Agency and European Topic Centre on Waste and Materials in a Green Economy (2021)². The concept spans five phases of an economic entity's life cycle:

- design,
- production/construction,
- use,
- recycling/deconstruction, and
- (raw) materials.

All phases taken together constitute the operational context of the BAUHALPS project in that it pursues a holistic view that takes the entire construction value chain and its protagonists (from building owners to architects to builders to recyclers) into account.

The concept is then further informed by two pieces of regulation: one being the EU's Taxonomy Regulation (entered into force on 12 July 2020), and more specifically the Do No Significant Harm (DNSH) criterion as spelled out in Art. 17 of Regulation (EU) 2020/852, which determines that no economic activity should be in conflict with the taxonomy's six climate and environmental objectives in order to qualify as environmentally sustainable. Those six objects are:

- Climate change mitigation
- Climate change adaptation
- Sustainable use and protection of water and marine resources
- Transition to a circular economy

² European Environment Agency and European Topic Centre on Waste and Materials in a Green Economy (2021). A framework for enabling circular business models in Europe. [Source: [A framework for enabling circular business models in Europe | European Environment Agency's home page](#), Accessed 10.09.2025]



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- Pollution prevention and control
- Protection and restoration of biodiversity and ecosystems

The taxonomy is a European classification system seeking to establish a common understanding of what constitutes sustainable economic activities, helping to “direct invest to [those] economic activities most needed for the transition, in line with the European Green Deal objectives.” The other piece of regulation being the Italian standard on measuring and evaluating circularity UNI/TS 11820:2022. The technical specification was published on 30 November 2022, defining “a set of indicators needed to assess, through a rating system, the level of circularity of an organisation or group of organisations. The rating system does not stipulate minimum levels of circularity but provides an assessment of the level achieved.”

NEB Values

Placed around the core of the model on the second and third layer are the values and working principles of the NEB initiative. The initiative is a strategic driver for Europe’s green and digital transformation and a central reference for the BAUHALPS project. Its rationale lies in fostering a future that is not only climate-neutral and resource-efficient but also inclusive and aesthetically enriching. It acknowledges the fact that the green transformation is not so much a technological but rather cultural project. The NEB’s three core values – sustainability, aesthetics, and inclusion – serve as guiding principles for reimagining how we design spaces, systems, and services. They encourage innovation that is environmentally responsible, socially just, and emotionally resonant, guiding investment, design, and development across sectors. Alongside these values the NEB working principles – participation, multi-level engagement and transdisciplinarity – ensure that solutions are co-created (across disciplines, sectors, construction phases and communities), scalable, and rooted in local contexts. This is to foster trust, accelerate adoption and strengthen regional competitiveness.

Within the context of the BAUHALPS project, the NEB values and working principles are used as a catalyst for circular building practices. That is, each phase of the construction value chain is informed by and ought to engage with the NEB initiative.



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For building owners, architects, planners, developers, producers, recycling companies and other stakeholders from the construction value chain, the NEB offers cross-disciplinary collaboration, unlocking new markets and funding opportunities through design-led innovation and circular economy models. For administrators and policymakers, it offers a framework to align urban development, cultural policy, and climate goals with citizen engagement and social equity.

The following breakdown of the NEB values and working principles is borrowed from the NEB Compass³, which offers an introduction to the initiative and its conceptual building blocks as well as guidance for decision- and project-makers as to how to apply these. The NEB mechanism rests upon three guiding values and working principles as mentioned above. Each of these is stratified across different ambition levels - one to three or rather baseline to transformative – to encourage and support continuous improvement. As will be further explained in Chapter 3 “Operationalisation”, this does not fully translate into the BAUHALPS project.

- **Sustainable:** Sustainability begins with reducing environmental impact, progresses to regenerative practices, and culminates in systemic ecological integration.
 - Ambition I: to repurpose
 - Ambition II: to close the loop
 - Ambition III: to regenerate
- **Inclusive (together):** Inclusion starts with basic accessibility, advances to active stakeholder engagement, and reaches full co-creation and social equity.
 - Ambition I: to include
 - Ambition II: to consolidate
 - Ambition III: to transform
- **Aesthetic (beautiful):** Aesthetics evolves from functional design to emotionally resonant spaces, ultimately fostering cultural meaning and beauty that enrich everyday life.
 - Ambition I: to activate
 - Ambition II: to connect
 - Ambition III: to integrate

³ European Commission (2022). *New European Bauhaus Compass – A guiding framework for decision and project makers wishing to apply the NEB principles and criteria to their activities*. Brussels, 2022 [Source: [405245f4-6859-4090-b145-1db88f91596d en](https://ec.europa.eu/easip/en/new-european-bauhaus-compass)].



The NEB working principles guide the implementation of these values through multi-level engagement, transdisciplinary approaches, and participatory processes.

- **Multi-level engagement:** Multi-level engagement starts with local implementation (connecting horizontally), expands to coordination across various levels and scales (connecting vertically) and reaches systemic integration in global dimensions.
 - Ambition I: to work locally
 - Ambition II: to work across levels
 - Ambition III: to work globally
- **Transdisciplinary approach:** Transdisciplinary approaches move from multidisciplinary collaboration to integrated knowledge exchange, ultimately fostering new hybrid practices that transcend traditional boundaries.
 - Ambition I: to be multidisciplinary
 - Ambition II: to be inter-disciplinary
 - Ambition III: to be beyond-disciplinary
- **Participatory processes:** Participatory processes begin with basic consultation, evolve into active stakeholder involvement and culminate in full co-creation, where communities shape outcomes from the start.
 - Ambition I: to consult
 - Ambition II: to co-develop
 - Ambition III: to self-govern

These principles ensure that NEB projects are not only technically and aesthetically sound but also democratically grounded and socially embedded. They promote innovation through inclusive dialogue, policy alignment, and knowledge diversity. By applying these principles with increasing ambition, project-makers can create environments that reflect the NEB's transformative vision - beautiful, sustainable, and inclusive – while fostering long-term resilience and cultural relevance.



Genius Loci Repertoire

BAUHALPS places particular emphasis on the notion of locality, arguing that it is the local building ecosystems, communities and resources (knowledge, skills, materials, labour etc.) that are to be activated in pursuit of a green transformation in order to win the support of the local population. The notion of Genius Loci (Latin for “spirit of the place”) refers to the unique atmosphere, identity, and emotional resonance of a specific location. Traditionally rooted in Roman mythology, the concept has evolved into a design and planning principle that emphasises sensitivity to local context. It invites architects, planners, and communities to respond to the character of a place rather than impose generic solutions.

Within the context of BAUHALPS the Genius Loci is focused on three aspects – relationships, knowledge, and resources – that taken together constitute what is being referred to here as Genius Loci Repertoire. The scope of the Genius Loci Repertoire was inspired by the BAUHALPS Expert Workshop that took place in the early stages of the BAUHALPS project (Work Package 1, Reporting Period 2) and reflections on ideal-type circular building systems. The workshop offered a big picture and tapped into the composition of the building system, the complex relationships between its actors and the various ontological elements or components through which such systems come into being and are maintained (from standards and laws to structures and procedures to materials and technologies). The information gathered has been systematised into the following structure:

- **Relationships:** Relationships refer both to human and non-human actors, forming a dynamic ecology of place. Circularity respects this interplay by recognizing how both people and things contribute to shaping spatial identity and transformation. For example, reclaimed wood carries both material and symbolic weight, acting as a source of action in design decisions.
 - Actors (e. g. residents, builders, designers, community members etc.)
 - Actants (non-human forces like materials, landscapes, and histories)
- **Knowledge, skills, techniques, strategies etc.:** Embedded within the genius loci are different layers and forms of knowledge. Circular building practices can revive and integrate these forms of knowing to create regenerative, context-sensitive solutions.



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- Tacit and explicit knowledge (tacit knowledge includes embodied practices, local craftsmanship and intuitive spatial understanding whereas explicit knowledge refers to documented techniques, standards, and strategies)
- Present and absent present (e.g. knowledge stored in cultural heritage, oral histories, and forgotten methods)
- **Resources:** Resources within the genius loci repertoire are not only physical but also symbolic. These different elements offer continuity, meaning, and identity. Circularity guided by genius loci transforms reuse into a cultural act—preserving memory while enabling innovation.
 - Cultural heritage, locally sourced materials, life histories embedded in buildings and landscapes etc.

Domains of Innovations

Within the BAUHALPS framework, innovation is not treated as an isolated phenomenon but as a dynamic driver embedded across the conceptual lenses of the model. It serves as a **connective tissue** between circular building practices, NEB values and working principles, and the Genius Loci repertoire, pointing to the various dimensions of innovation that might come into play. Innovation in this context is understood as the capacity to generate and apply new ideas, methods, or technologies that create systemic value by advancing the transition toward circularity (be it through technological progress or otherwise such as the strengthening of cultural identity, social equity, ecological responsibility, or indeed economic sensibility).

It thrives in environments that foster openness, collaboration, and learning, which the BAUHALPS model operationalises through participatory processes, multi-level engagement, and transdisciplinary approaches, i. e. the implementation of the NEB working principles. Innovation framed in such a way is not merely about novelty but about change that resonates with the NEB's guiding values: sustainability, aesthetics, and inclusion. Four domains of innovation are being differentiated, and how they might play out in circular transformation is considered below:

1. Economic Innovation

Economic innovation within BAUHALPS relates to reconfiguring business models and value chains to support circularity. It addresses:



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- **Value proposition:** (Business) solutions that redefine ownership and value (such as going from linear transactions (buy-build-dispose) to circular services (design-use-recover-reuse) or from isolated buildings to networked systems that share resources across communities)
- **Value creation/delivery:** Collaborative production models leveraging local resources and skills.
- **Value capture:** Mechanisms for reinvesting in regional ecosystems and communities.

Link to BAUHALPS: Supports the “Field of Production” lens by aligning industry practices with NEB principles and circular economy standards.

2. Technological Innovation

Technological innovation drives, in particular, the material and process dimension of circular building:

- **Production:** Development of bio-based or reclaimed materials.
- **Construction:** Advanced techniques such as 3D printing for adaptive reuse.
- **Use:** Smart systems for energy efficiency and lifecycle monitoring.

Link to BAUHALPS: Anchored in the “Circular Building” lens, ensuring compliance with DNSH criteria and UNI/TS 11820 indicators.

3. Social Innovation

Social innovation ensures that circularity is a lived experience, not just a technical standard:

- **Health and wellbeing:** Designing spaces that foster resilience and active lifestyles.
- **Community engagement and governance:** Co-creation processes that empower local actors.



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- **Education and skills development:** Training hubs for reuse, repair, and design thinking.

Link to BAUHALPS: Operationalises NEB working principles – participation, transdisciplinarity and multi-level engagement – within the “Communities of Inquiry” lens.

4. Cultural Innovation

Cultural innovation reframes circularity as a cultural mission:

- **Heritage-informed design and adaptive reuse:** Integrating traditional techniques with circular principles.
- **Creative placemaking and storytelling:** Embedding local narratives in spatial design.
- **Material culture and design innovation:** Reviving craftsmanship and aesthetic values in new material cycles.

Link to BAUHALPS: Draws on the “Genius Loci Repertoire”, ensuring that circular solutions resonate with local identity and aesthetics.

By situating these domains within the conceptual architecture of the BAUHALPS model, innovation becomes a multidimensional lever for transformation, bridging technical feasibility with cultural meaning and social acceptance. Each domain interacts with the NEB values and working principles, reinforcing the model's ambition to treat circularity as a cultural, ecological, and economic project rather than a purely technological one.

Communities of Inquiry (Co)

A community of inquiry might best be understood as a group of people engaged in shared exploration, reflection and knowledge-building to the end of solving a problematic situation. Rooted in American Pragmatism and specially the works of C.S. Peirce and John Dewey, it emphasizes democratic participation, critical thinking, and shared responsibility for inquiry. Members, tied together by a set of unifying rules and forms of engagement (read: research paradigm), collectively examine assumptions,



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test ideas, and adapt solutions through open discussion. Dewey viewed inquiry as inherently social, where meaning emerges from interaction rather than isolated thought. This approach nurtures a scientific attitude of mind, fosters habits of reflection, collective problem-solving and transdisciplinary exchange, making them ideal for addressing complex societal challenges. In practice, they enable diverse stakeholders - citizens, experts, policymakers, creatives – to co-create solutions through inquiry-driven processes. Rather than delivering fixed answers, communities of inquiry cultivate shared understanding and adaptive learning, making them especially valuable in contexts of innovation, sustainability and transformation. Their strength lies in their ability to bridge knowledge silos and empower participants to shape outcomes collaboratively.

In the context of this project, three different communities of inquiry are differentiated based on their relative proximity/distance to the actual pilot/building project. Notwithstanding this, their boundaries remain fluid, and areas of overlap naturally emerge as collaboration and dialogue progress.

- **Primary stakeholders**

- Building contractors, architects, producer, supplier, builder, demolition companies etc.

- **Secondary stakeholders**

- Community, politicians/ administrators, education/training providers, hospitals/medical practices, retailer/traders religious institutions etc.

- **Tertiary stakeholders**

- Certification authorities, trade associations, platform and data providers, training providers etc.

Field of Production

The field of production constitutes the broader social context of the BAUHALPS project or rather the individual pilot projects, within which circular building practices are being



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developed, tested, revised and implemented. It encompasses various sectors, ranging from industry to science and research to politics and administration to culture and arts to citizens and residents. Together they form a network of agents that determine how circularity is defined, practiced, and scaled within the built environment.

- Industry
- Education
- Science/Research
- Politics/Administration
- Culture/Arts

3. Operationalisation

This final section seeks to elaborate on how the NEB values and working principles might be embedded as indicators within the BAUHALPS circularity maturity assessment tool. It is important to point out that not all the five conceptual lenses outlined above enter the tool (directly) but only the values and working principles of the NEB. To this end they must be translated into measurable dimensions that reflect their respective degree of implementation in circular building practices.

- **Sustainability** might be evaluated not only in terms of material efficiency, but also in how far a project would regenerate ecosystems, reduce emissions and support long-term adaptability. Possible indicators include:
 - Material circularity – extent to which materials are reused, recycled, or bio-based across the building lifecycle.
 - Energy and resource efficiency – degree of energy efficiency, water use reduction and minimisation of embodied carbon.
 - Regenerative potential – contribution to ecosystem restoration, biodiversity, and climate resilience.



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- Lifecycle thinking – integration of cradle-to-cradle principles and long-term adaptability in design and construction.
- **Aesthetics** could be assessed by the degree to which circular solutions would enhance spatial quality, cultural resonance, and emotional connection, ensuring that reuse and efficiency would not compromise beauty or meaning. Indicators may include:
 - Spatial and sensory quality – quality of light, acoustics, form, and atmosphere contributing to user experience.
 - Cultural resonance – reflection of local identity, traditions, and narratives in design and materials.
 - Craftsmanship and detail – attention to material expression, construction quality, and artisanal value.
 - Emotional connection – ability of the space to evoke meaning, attachment, and a sense of belonging.
- **Inclusion** would be measured by how deeply diverse stakeholders would be involved, how accessible the outcomes would be and whether social equity would be embedded in both process and result. Indicators may include:
 - Accessibility – physical, cognitive and social accessibility for diverse users.
 - Stakeholder participation – degree of involvement of users and communities in planning and design.
 - Social equity – contribution to fair access to resources, opportunities and benefits.
 - Affordability and usability – balance between cost, functionality and long-term value for all user groups.

Each value would be scored/described independently, allowing users to reflect on their current position and identify areas for growth. If structured this way, the tool would not only measure circularity but also guide a value-driven transformation, helping projects align with the NEB's vision of a beautiful, sustainable and inclusive future. As for the NEB working principles, these might be operationalised as follows:

- **Multi-level engagement** would be assessed by how well a project would align and



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collaborate across functions, sectors, scales and levels of operation and governance. At higher ambition levels, this principle would reflect systemic integration and policy coherence. Indicators may include:

- Diversity of expertise involved (e.g. architecture, ecology, social sciences).
 - Presence of interdisciplinary project teams.
 - Evidence of knowledge exchange across sectors.
 - Inclusion of non-technical knowledge (e.g. cultural, artistic, indigenous)
- **Transdisciplinarity** could be measured by the diversity and integration of knowledge systems involved. A transformative level would require not only collaboration across disciplines but the emergence of new, hybrid practices. Indicators may include:
 - Integration of local, regional, and EU-level circularity goals.
 - Collaboration between public, private, and civic actors.
 - Policy coherence and institutional support for circular practices.
 - Mechanisms for scaling and replicating successful models.
 - **Participation** might be evaluated by the extent to which stakeholders would be involved in shaping circular building processes. A baseline level could reflect basic consultation, while a transformative level would require deep co-creation and shared ownership of outcomes. Possible key metrics include:
 - Number and diversity of stakeholders involved (e.g. citizens, designers, SMEs).
 - Use of participatory methods (e.g. workshops, co-design sessions).
 - Degree of influence stakeholders have on decision-making.
 - Feedback loops and responsiveness to community input.

Were the NEB values and working principles to be operationalised in the circularity maturity assessment tool, this would gain a multidimensional evaluative capacity. It would integrate qualitative dimensions such as beauty, inclusion and sustainability alongside technical circularity metrics. This could enable broader stakeholder engagement, support cross-sectoral innovation and align circularity with cultural and societal goals. As a result, the tool would differ from others by assessing not only systemic efficiency but also socio-cultural impact, making it more relevant for policy, funding and strategic development in complex transition contexts.



4. Final Remarks

The BAUHALPS model offers a novel conceptual framework for integrating circularity metrics with the values and working principles of the New European Bauhaus. Designed as both an interpretative and operational tool, it situates circular building practices within a broader cultural, ecological and social context. By combining regulatory standards such as the EU Taxonomy's Do No Significant Harm (DNSH) criteria and the Italian UNI/TS 11820 circularity standard with NEB's core values – sustainability, aesthetics and inclusion – the model enables a multidimensional approach to assessing and advancing circularity in the built environment.

Set in the Alpine region, BAUHALPS treats the territory as a real-life laboratory, mobilising local knowledge, resources and communities to co-create regenerative building systems. The model is structured around five conceptual lenses: circular building, NEB values and principles, genius loci repertoire, domains of innovation and communities of inquiry. These lenses guide the development of a circularity maturity assessment tool that not only measures technical performance but also captures cultural relevance, stakeholder engagement and aesthetic quality.

By embedding NEB principles into measurable indicators, BAUHALPS fosters transdisciplinary collaboration and systemic transformation. It positions circular architecture as a cultural mission, aligning technological innovation with regional identity and social equity - thus redefining sustainability as a lived and shared experience.

