

IM FOKUS

Circular building

The resources we use in our buildings are far too precious, too scarce, too energy-intensive and too carbon-intensive to be squandered without consideration or even thrown away. Adhering to the principles of circular building is a golden opportunity to meet the challenges of today and tomorrow regarding the materials we use in buildings, our supply chains, the environment and, of course, our health. At the core of this lies a disciplined approach to the underlying concepts of circular thinking, different requirements, design principles and detailed implementation.

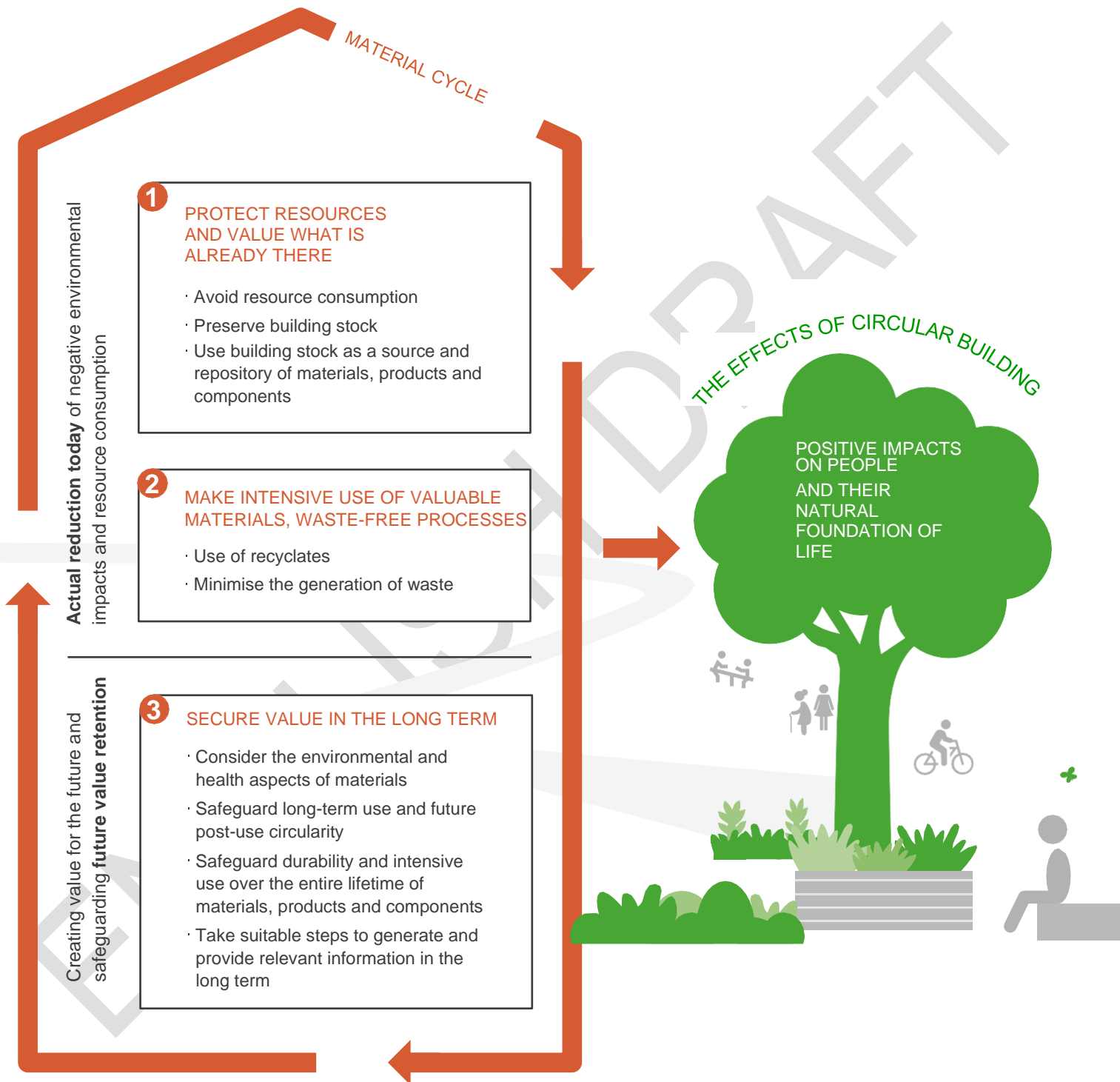
The aim of this document is to promote a common understanding of the concept of circular building such that as a strategy, it becomes an integral feature of every construction project. It should help all kinds of stakeholders in the building and property industry to think ahead when discussing and defining their individual goals and priorities for projects. It should also help align companies and organisations with the principles of the circular economy. Not only does this allow you to take a stand on the transformation that is now so urgently needed, it also enables you to play an active part in the practical application of circular building and its important contribution to sustainable building.

WHAT ACTUALLY IS 'CIRCULAR BUILDING'?

In adhering to the spirit of circular building, stakeholders in the building and property industry **1** concern themselves with the preservation, upgrading and active use of existing buildings. They do this by seeing building stock as a valuable source and repository of materials. This involves making extensive use **2** of existing material flows and tapping into value that has already been created. As well as paving the way for resources to be used in the long term, this allows different stakeholders to prepare the way for **3** closed-loop systems such that in the future, no waste is produced over the entire life cycle of materials. By taking ecological and health factors into account, they thus promote the preservation or enhancement of the quality and economic value of urban districts, buildings, components and materials.

As key players in a circular society, these stakeholders make important and positive contributions to a variety of sustainability goals through circular thinking and action. They act in accordance with the cycles of nature and make a distinction between their business activities and the consumption of non-renewable resources.

CIRCULAR STRATEGIES WITH A FOCUS ON MATERIAL CYCLES



GOALS RELATING TO INDIVIDUAL PROJECTS AND FOCUS TOPICS

Depending on the circumstances when a building project gets underway, there are varying degrees of potential to implement circular strategies. For example, renovation measures offer different options compared to new building projects involving demolitions or partial material recovery. With every project, it's therefore important to start from scratch and explore individual possibilities and, as far as possible, implement your options accordingly. As a stakeholder in the circular building and property industry, we invite you to use the following checklist to implement the principles of circular strategies for your projects:

1 PROTECT RESOURCES AND VALUE WHAT IS ALREADY THERE

Avoid resource consumption

- The concept of purely satisfying needs; avoidance of materials that would normally be used
- Satisfy needs without using material resources
- Reduce areas and functions of buildings and construction elements
- More intensive and longer use of existing areas e.g. through multipurpose use
- Reduce use to only necessary components, construction elements and buildings
- Material-saving solutions
- Use resource-saving prefabricated parts

Preserve building stock

- Conservation and restoration of existing buildings
 - Maintenance, repair and overhaul of existing buildings
 - Renovations/modernisation of existing buildings
 - Expansion of building stock
 - Rejection of unnecessary new buildings
 - Demolition only as a last resort, and only if entirely justified
- Use building stock as a source and repository of materials
- Reuse of building materials for the same function
 - Repurposing of buildings materials for other functions
 - Offer products / components through exchange platforms

2 INTENSIVE USE OF VALUABLE MATERIALS, WASTE-FREE PROCESSES

Use of recyclates

- Prioritise the use of high-quality recycled materials (closed-loop recycling)
- Use of ('recycled') materials of lower quality

Minimise the generation of waste

- Zero-waste / minimum-waste production and supply chains
- Zero-waste or minimum-waste building sites
- Zero-waste or minimum-waste building operation
- Zero-waste or minimum-waste deconstruction

3 SECURE VALUE IN THE LONG TERM

Consider the environmental and health aspects of materials

- Systematic avoidance of pollutants and risk substances, including in material coatings, finishes, etc.
- Consideration of environmentally friendly and responsible supply chains
- Base decision-making on carbon emissions
- Use of renewable, compostable materials

Safeguard durability and intensive use over the entire lifetime of materials, products and components

- Ensuring ease of repair
- Include flexibility and adaptability in planning in keeping with building use and contextual factors
- Include multipurpose use and different functions in the planning of areas, components and building elements
- Make use of sharing schemes and circular business models
- Use building components that are expected to last for a sufficiently long period

Safeguard long-term use and future post-use circularity

- Use reusable products/building elements and plan for future removal
- Give priority to mono-materiality
- Use standard formats
- Ensuring unmixed material separation; use reversible, damage-free, separable connections

- Ensuring materials are recyclable/compostable; evaluate during planning
- Use of products with manufacturer or association take-back systems

Take suitable steps to generate and provide relevant information in the long term

- Material and building component catalogue Building
- resource passport
- Repair, maintenance and usage instructions

POSITIVE IMPACTS ON PEOPLE AND THEIR NATURAL FOUNDATION OF LIFE XXX

Implemented effectively, circular strategies have a positive impact on the local economy, they foster a sense of identity and they promote good health. They also have a whole host of positive impacts when it comes to climate change mitigation, ecosystems and water cycles. Many of these effects can be logged and documented using methods that focus on the life cycle of buildings, such as the life cycle assessment (LCA) and life cycle costing (LCC). Just like the evaluation criteria used to assess the sustainability of supply and value chains, these lay a foundation for decision-making based on hard facts.



PRODUCING EVIDENCE AND ASSESSING CIRCULARITY STRATEGIES AS PART OF THE DGNB SYSTEM

Circular building is a central aspect of the DGNB System. Ever since the very first version of the DGNB System was drafted in 2008, key factors such as the responsible use of resources, planning buildings with a strong focus on life cycles, making it easy to recover and recycle materials, and avoiding critical substances have been given high priority in the certification criteria. Circularity concepts judged to be particularly progressive also have a positive impact on assessment outcomes in the form of 'circular economy' bonus points.

In addition, reusing, recycling or avoiding the use of material resources results in better evaluations of the carbon footprint and life cycle assessment (LCA) of a building. Buildings that are planned and subsequently built with circularity in mind can already fulfil more than a third of the requirements in the so-called total performance index of DGNB certification.

In 2020, the DGNB introduced its own Deconstruction of Buildings system. For the first time, this made it possible to assess the sustainable and circular construction or demolition of entire buildings (or parts of buildings) during certification.

DGNB CRITERIA THAT PLACE PARTICULAR EMPHASIS ON CIRCULAR BUILDING



Renovation/New Construction

- ENV1.1 Building life cycle assessment
- ENV1.2 Local environmental impact
- ENV1.3 Sustainable resource extraction
- ECO1.1 Life cycle cost
- ECO2.1 Flexibility and adaptability
- TEC1.6 Ease of recovery and recycling

Deconstruction (currently only available in German)

- ENV1-R (Material flow balance
- ENV2-R Hazardous substance renovation)
- ECO1-R Risk assessment and cost predictability
- ECO2-R Value of dismantlable resources
- TEC1-R Recycling and disposal
- TEC2-R Unmixed material separation and circularity
- PRO1-R Planning of deconstruction (Pre-demolition audit)

RELEVANCE AND COMPATIBILITY – CURRENT DEVELOPMENTS WITH A BEARING ON CIRCULAR BUILDING

Currently, significant energy and effort are being invested in promoting circular building, on both a German domestic and a European level. Instruments and guidelines recently introduced by the EU are a clear indication that there will be even stronger demands for circular building in the future as a key contributor to sustainability goals; this will also be more clearly regulated.

The coalition agreement signed by the German government included an announcement on the introduction of digital building resource passports. In line with European developments, the DGNB formulated a discussion proposal for this concept, originally released for public comment in July 2022 (<https://www.dgnb.de/en/nachhaltiges-bauen/zirkulaeres-bauen/building-resource-passport>). All of these developments are being supported by a large number of industry stakeholders. Anyone determined to be ready for the many things that await us tomorrow should therefore start preparing for these developments today.

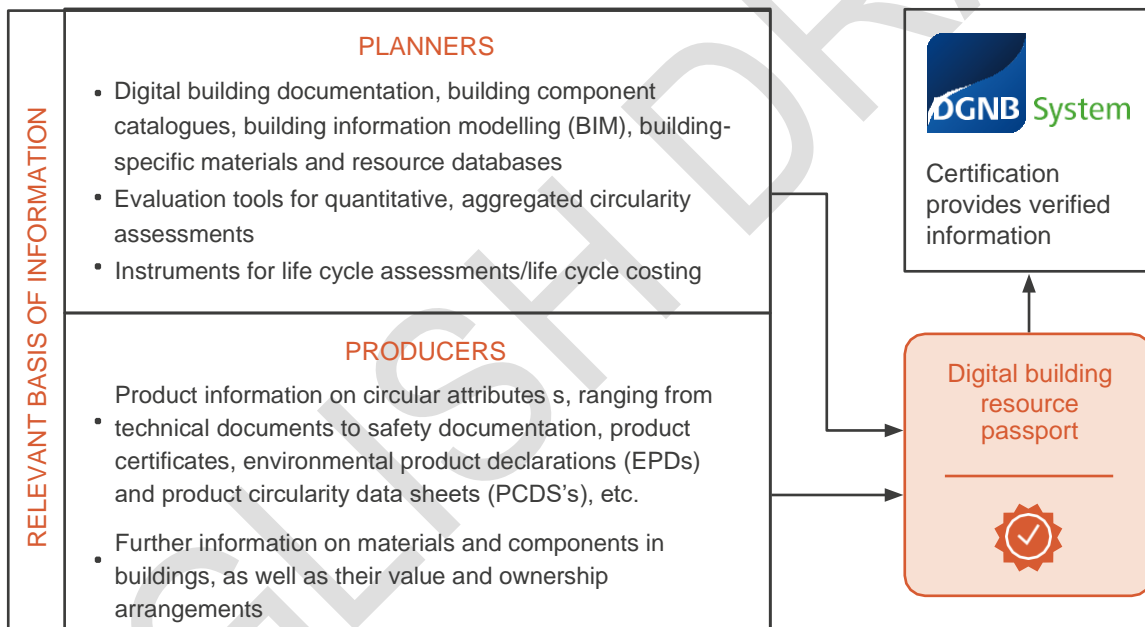


Figure: Instruments and the roles played by stakeholder groups driving circular building

INSTRUMENTS AND GUIDELINES ON A EUROPEAN LEVEL

Level(s) reporting framework of the EU: framework for reporting the sustainability performance of buildings

EU taxonomy: classification system for investments in sustainable activities

Other strategies of the EU: circular economy action plan; renovation wave

Standards: development and implementation of circular economy roadmaps; revision and development of new standards

FOCAL TOPIC: CIRCULAR BUILDING. The contents of this document were developed in collaboration with the DGNB Committee for Life Cycle and Circular Building.