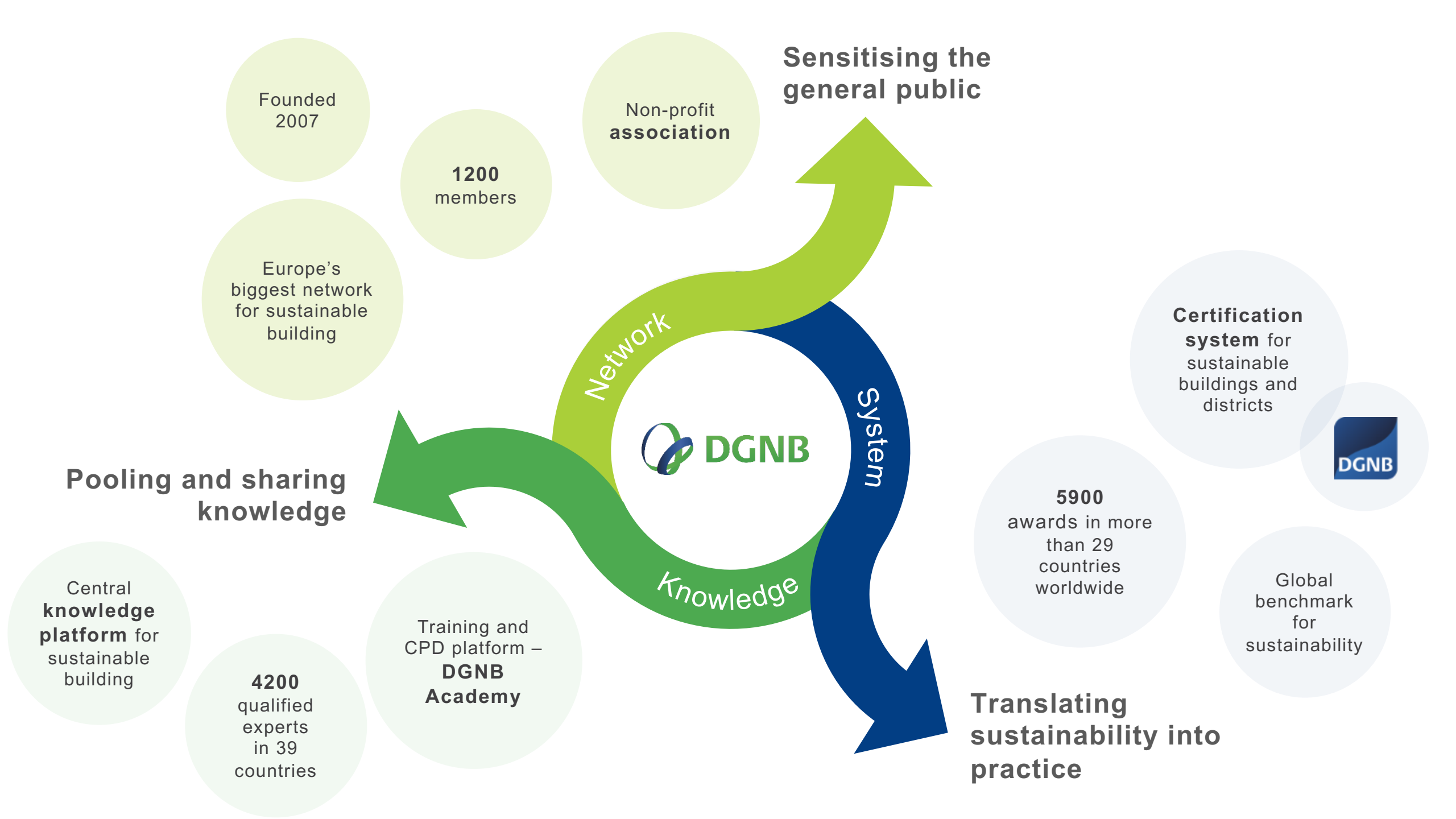
Cooling – Incentives for passive design and natural refrigerants in the DGNB System

June 23, 2020 | The Future of Air Conditioning! | Dr. Anna Braune

DGNB
Deutsche Gesellschaft für Nachhaltiges Bauen
German Sustainable Building Council

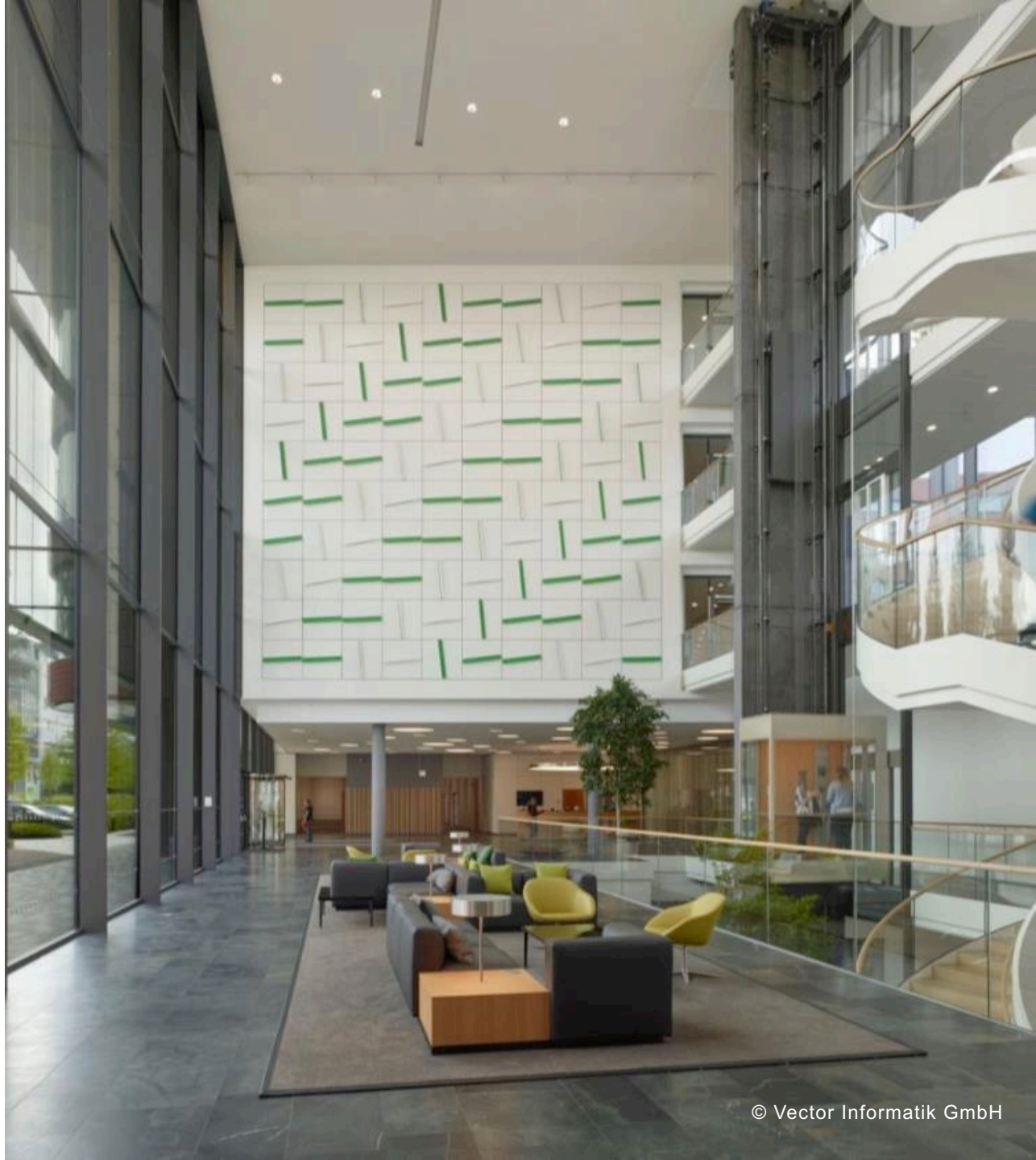
1. DGNB AND THE DGNB SYSTEM


Founded 2007
1200 members
Non-profit association
Sensitising the general public
Europe's biggest network for sustainable building
Network
System
Knowledge
DGNB
Pooling and sharing knowledge
Certification system for sustainable buildings and districts
DGNB
5900 awards in more than 29 countries worldwide
Global benchmark for sustainability
Central knowledge platform for sustainable building
4200 qualified experts in 39 countries
Training and CPD platform – DGNB Academy
Translating sustainability into practice

Our goals

Buildings that are known to be good and districts that are pleasant to live in for architectural environments with a future

Transformation of the construction and property market, promoting a sensible understanding of quality as a foundation for responsible and sustainable action



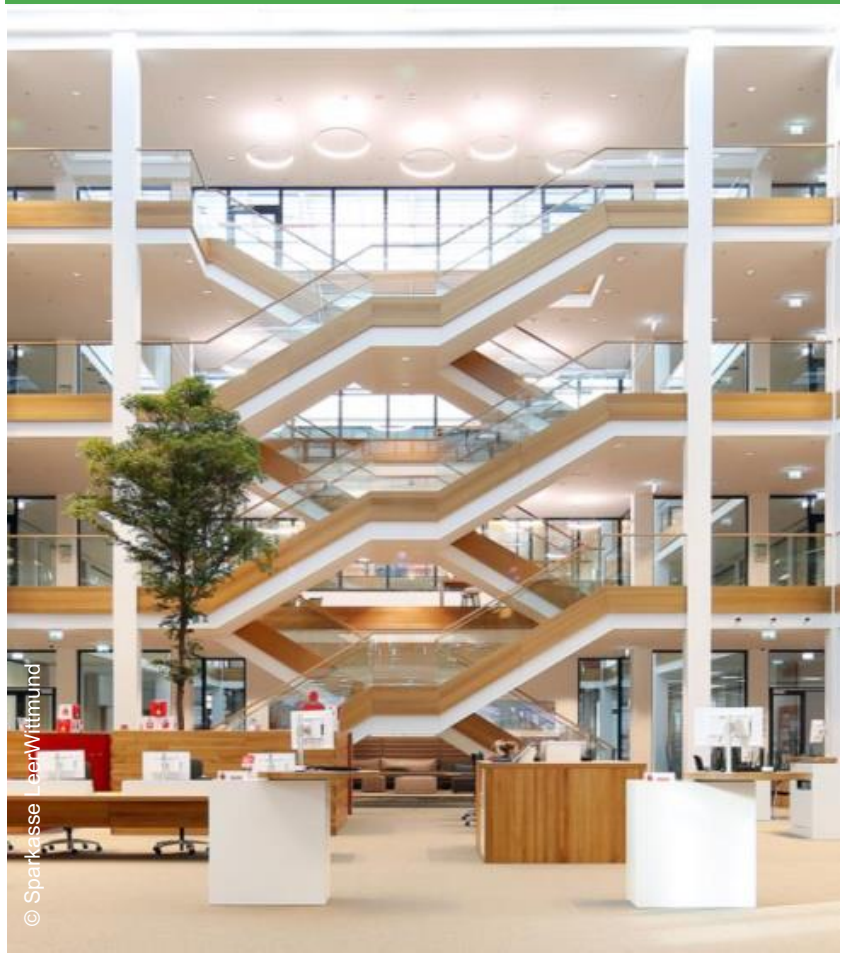
DGNB certification

Global benchmark for sustainability

DGNB System

More than a system

Building interiors



Buildings

Districts

6 Qualities for sustainable projects

Certification criteria for new constructions

ENVIRONMENTAL QUALITY

ENV1.1
Building life cycle assessment

ENV1.2
Local environmental impact

ENV1.3
Sustainable resource extraction

ENV2.2
Potable water demand and waste water volume

ENV2.3
Land use

ENV2.4
Biodiversity at the site

ECONOMIC QUALITY

ECO1.1
Life cycle cost

ECO2.1
Flexibility and adaptability

ECO2.2
Commercial viability

SOCIOCULTURAL AND FUNCTIONAL QUALITY

SOC1.1
Thermal comfort

SOC1.2
Indoor air quality

SOC1.3
Acoustic comfort

SOC1.4
Visual comfort

SOC1.5
User control

SOC1.6
Quality of indoor and outdoor spaces

SOC1.7
Safety and security

SOC2.1
Design for all

TECHNICAL QUALITY

TEC 1.1
Fire Safety

TEC1.2
Sound insulation

TEC1.3
Quality of the building envelope

TEC1.4
Use and integration of building technology

TEC1.5
Ease of cleaning building components

TEC1.6
Ease of recovery and recycling

TEC1.7
Immissions control

TEC3.1
Mobility infrastructure

PROCESS QUALITY

PRO1.1
Comprehensive project brief

PRO1.4
Sustainability aspects in tender phase

PRO1.5
Documentation for sustainable management

PRO1.6
Procedure for urban and design planning

PRO2.1
Construction site/ construction process

PRO2.2
Quality assurance of the construction

PRO2.3
Systematic commissioning

PRO2.4
User communication

PRO2.5
FM-compliant planning

SITE QUALITY

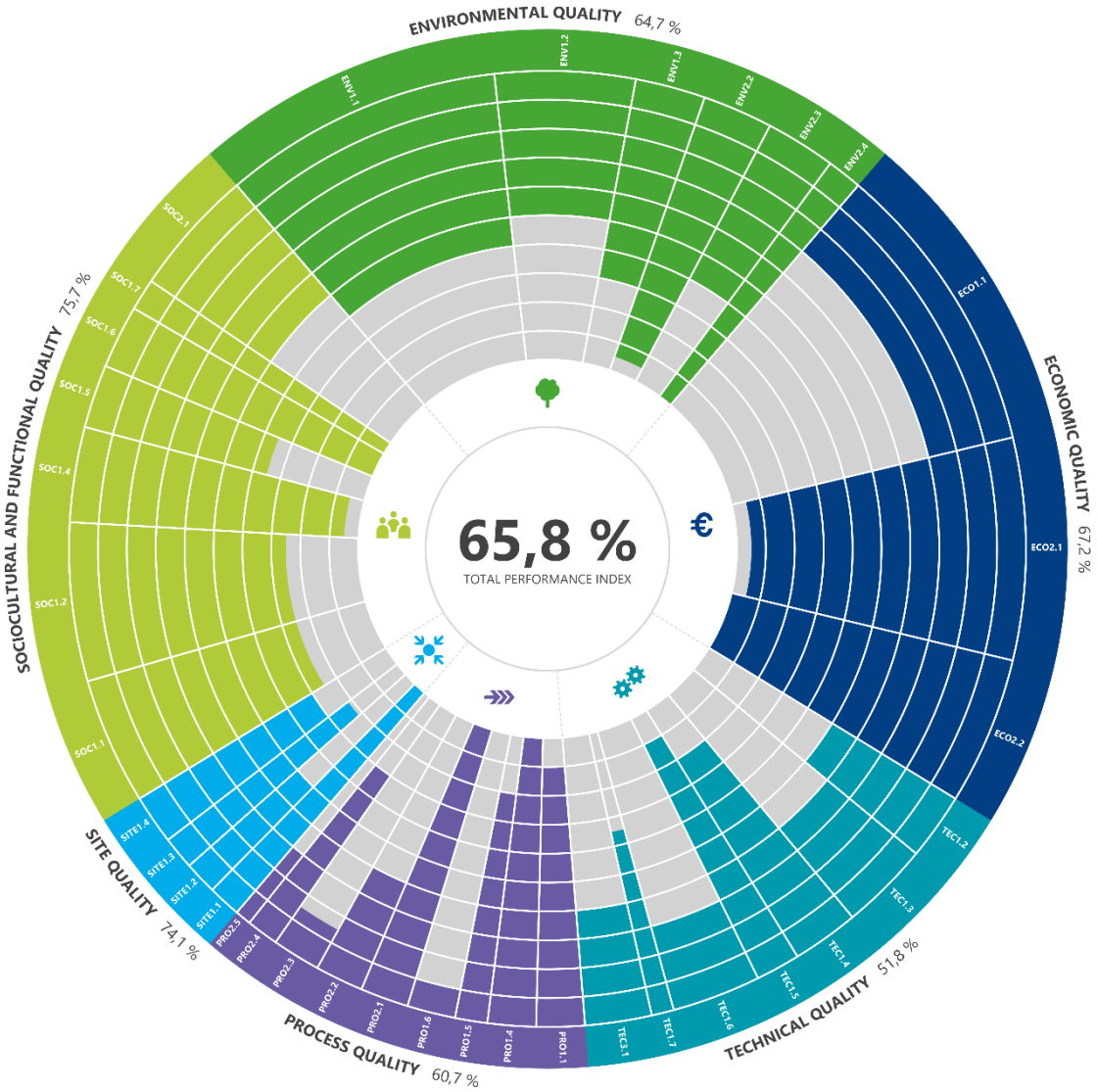
SITE1.1
Local environment

SITE1.2
Influence on the district

SITE1.3
Transport access

SITE1.4
Access to amenities

Optimize Sustainability



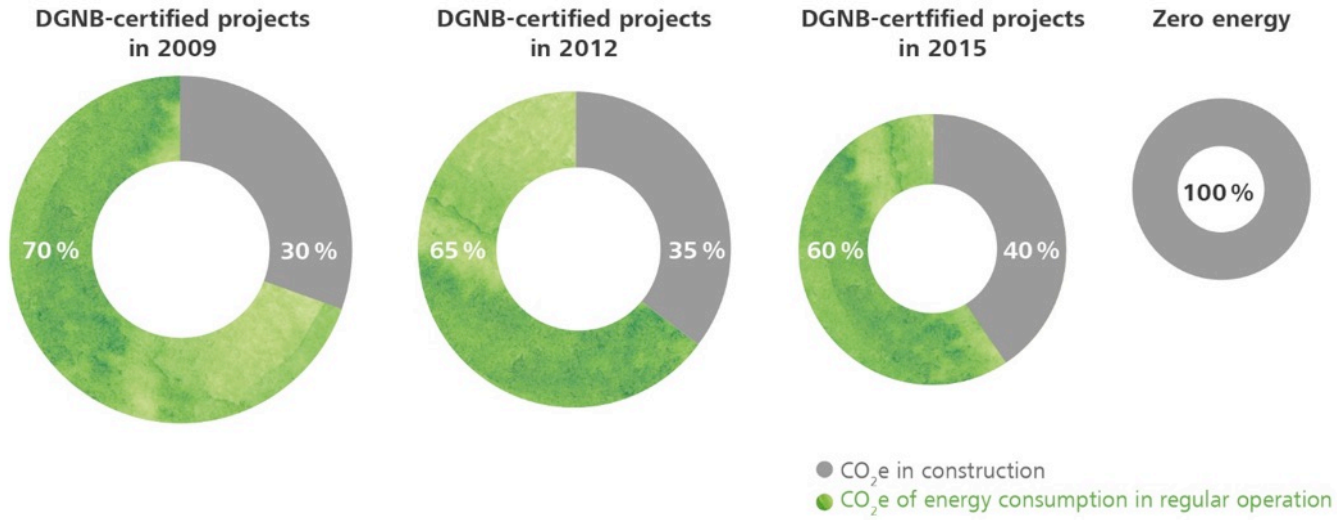
2. REFRIGERANTS AND PASSIVE DESIGN IN THE DGNB SYSTEM

ENV1.1 BUILDING LIFE CYCLE ASSESSMENT (9.5%)

Energy efficiency vs. construction?

50 years of heating, cooling and ligthing cause equally the same environmental impacts as production, refurbishment and end-of-life processes of buildings

We target at energy producing buildings, acting as CO2-sinks, that are environmentally optimized over the whole life cycle



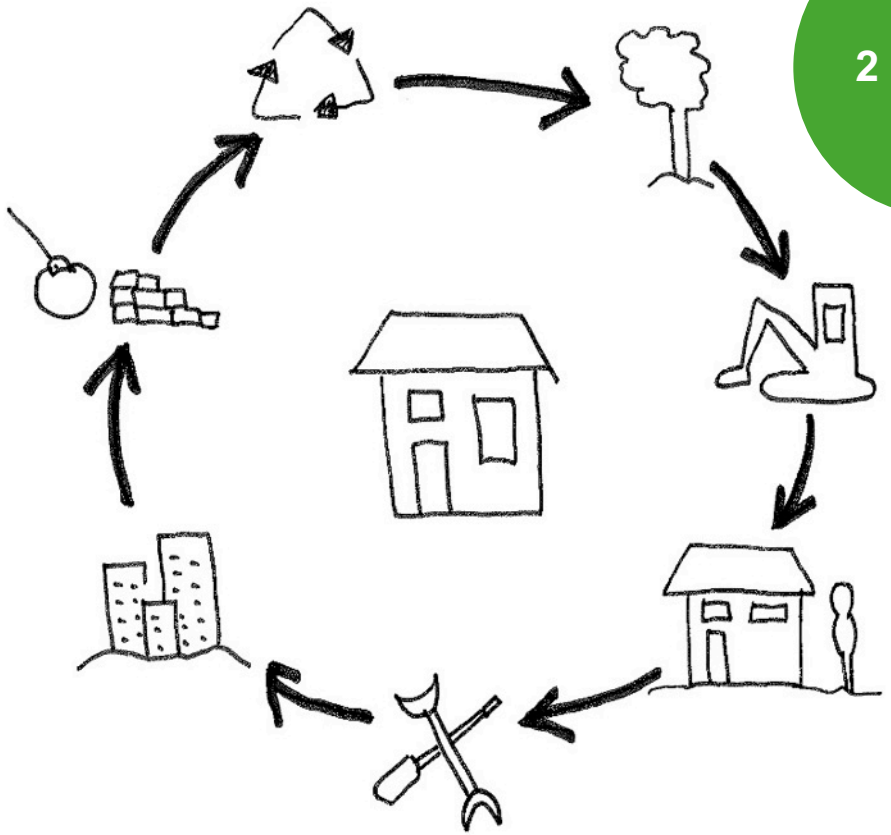
ENV1.1 BUILDING LIFE CYCLE ASSESSMENT (9.5%)

Indicator 6:

Halogenated hydrocarbons in refrigerants

Refrigeration systems that use refrigerants with a GWP factor ≥ 150 kg CO_2 equivalent in accordance with the schedule published by the German Federal Environment Agency (Umweltbundesamt (UBA)) should not be used. Such refrigerants also include substances that are still often used in building air conditioning systems such as R-134a, R-407c or R-410a. Buildings that are operated without active cooling also meet the requirements of this indicator

2 Points



Requested:

Evidence of refrigerant‘s GWP factor

ENV1.2 LOCAL ENVIRONMENTAL IMPACT (4.7 %)

Indicator 1:

Environmental friendly materials

Halogenated partly halogenated refrigerants are assessed as risky material and substance group

Additional Points in higher quality levels when realising cooling without halogenated / partly halogenated cooling agents

10 additional points

ECO1.1 LIFE CYCLE COST (10% - 12.9%)

Life cycle cost optimisation during the planning process

- Cost effectiveness of buildings mainly depend on cost efficient operation.
- Life cycle cost caculation allows a mid-term to long-term assessment of whole life costs.
- Incentives are provided if optimisation of costs include the analysis of passive design solutions or alternative refrigerants.

3 additional points

TEC1.4 Use and integration of building technology (2.3%)

Implementation of a passive building concept

Reduced use of technical systems in the building can result in a reduction of faults during building operation. The use of resilient building technology and renewable energy sources reduces the risk of increased costs and external dependencies, and is generally engineered towards long-term durability.

30 Points

Passive cooling

- ✓ Building orientation respects solar radiation
- ✓ Consideration of shading of trees or nearby buildings
- ✓ External solar protection by overhangs or solar systems
- ✓ Appropriate insulation
- ✓ Appropriate window areas
- ✓ Reduction of internal loads by IT or lighting
- ✓ Green facades and roofs
- ✓ Bright facades and roofing surfaces
- ✓ Night-time cooling down
- ✓ Passive or free cooling systems
- ✓ Use of activatible thermal mass
- ✓ Natural refrigerants (cooling towers, ground water, use of waste heat)
- ✓ Appropriate comfort standards

DGNB ACTIVITIES

1

AWARENESS RAISING

As part of our public relations work we continuously raise awareness amongst planners, owners and builders.

2

INCENTIVES WITHIN THE DGNB SYSTEM

Within several certification criteria, the DGNB system offers incentives for translating alternative solutions into action.

3

CARBON-NEUTRAL BUILDINGS

In its “framework for carbon-neutral buildings and sites“, the DGNB focuses on balancing CO_2 emissions, leakage of refrigerants should be considered.

4

COMMITTMENT

Designers committ with DGNB‘s „Phase Sustainability“ declaration, to address sustainability aspects with clients.

Thank you!

DGNB
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German Sustainable Building Council

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