

Making sustainability happen:

Carbon neutral buildings and sites

(Insights from the DGNB System)

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Founded
2007

Non-profit
association

>1,500
members

Europe's
biggest network
for sustainable
building

Sensitising the
general public

Network



System

Knowledge

Pooling and sharing
knowledge



Central
knowledge
platform
for
sustainable
building

> 5,100
qualified
experts
in more than
40 countries

Training and
CPD platform –
DGNB Academy

Certification
system
for
sustainable
buildings and
districts

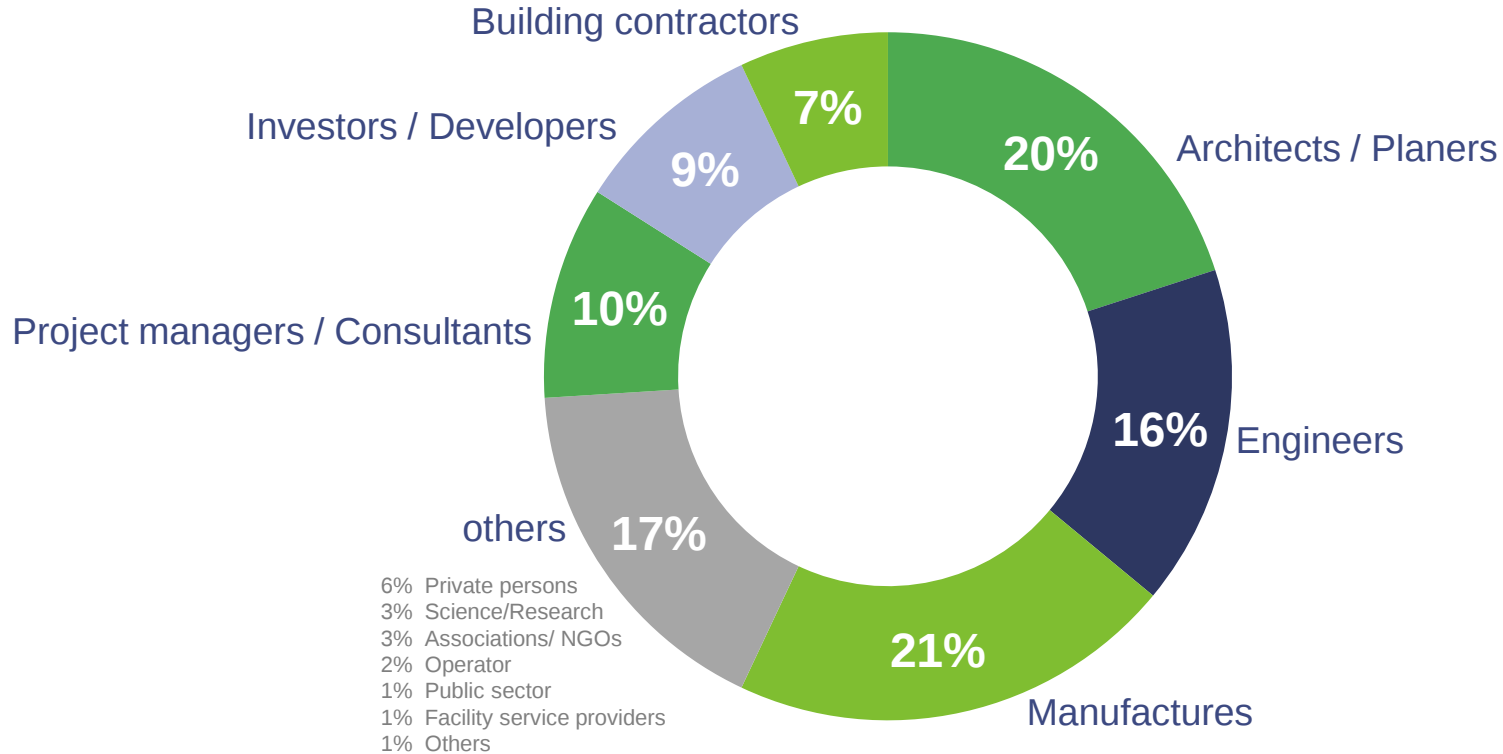


> 8,000
awards in more
than 29
countries
worldwide

Global
benchmark
for
sustainability

Translating
sustainability into
practice

DGNB members



Certification Systems

The DNA of the DGNB system



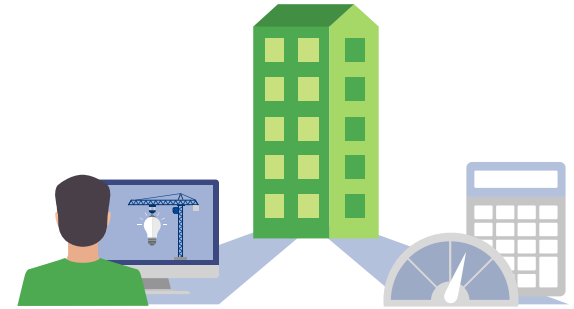
Life cycle assessment

All audits take the entire life cycle of a building project into account



Holistic

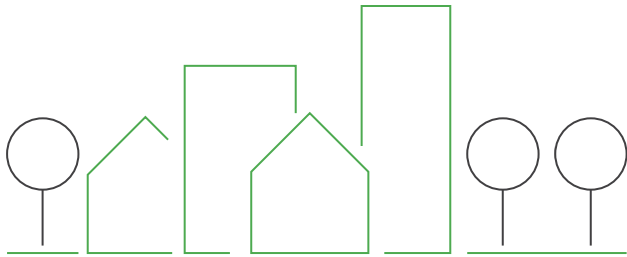
Equal emphasis on three core sustainability factors: environmental, economical and sociocultural



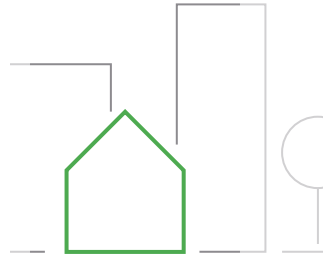
Emphasis on performance

The DGNB System assesses the overall performance of a development and not just individual measures

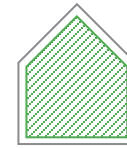
DGNB certification schemes for Buildings and Districts



Districts



Buildings

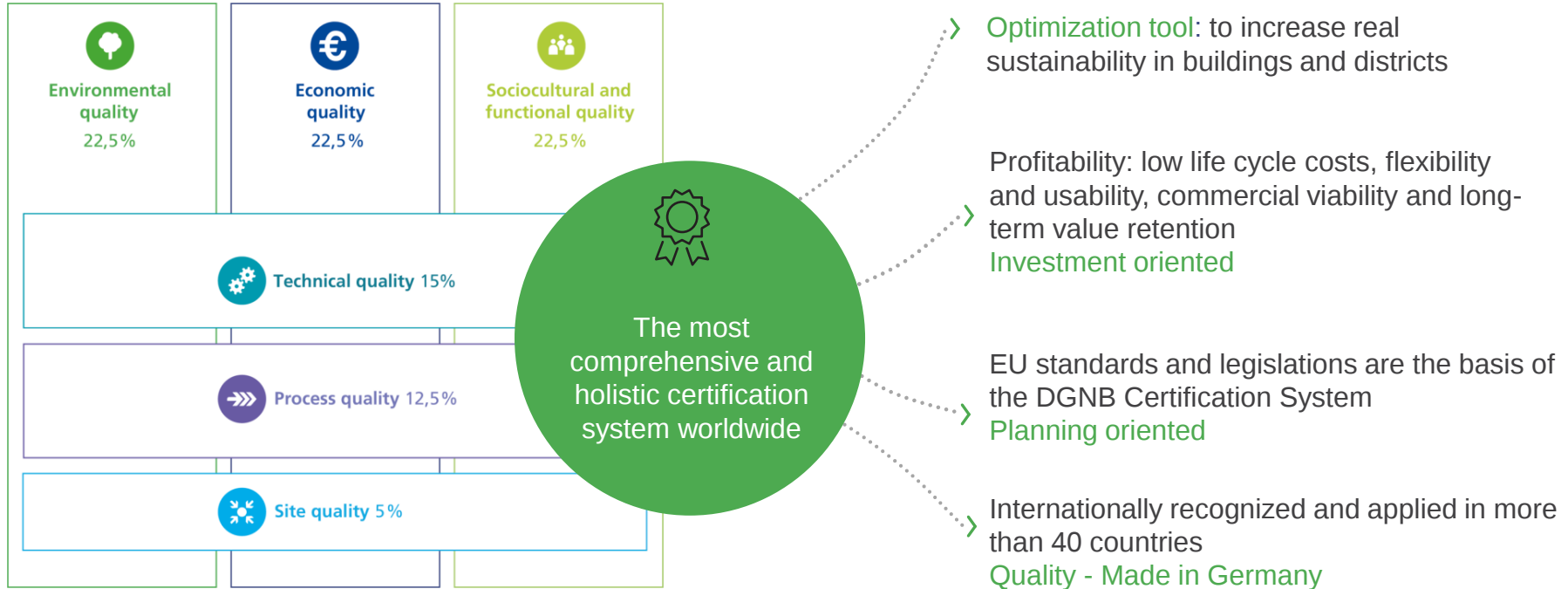


Interiors

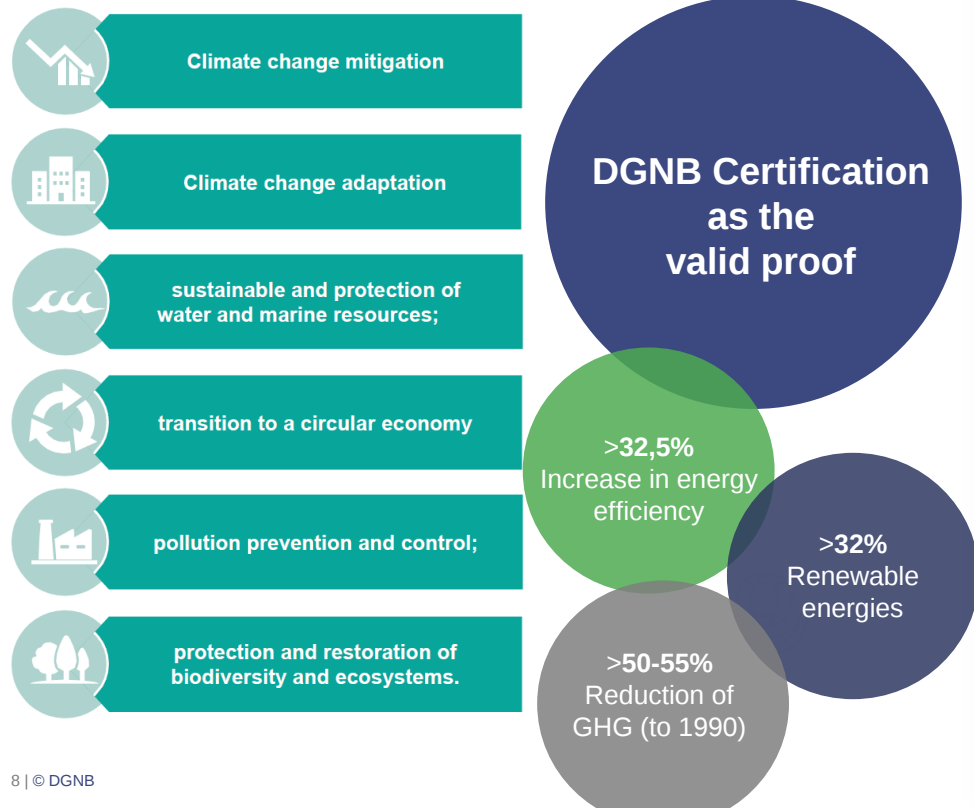


Building In Use

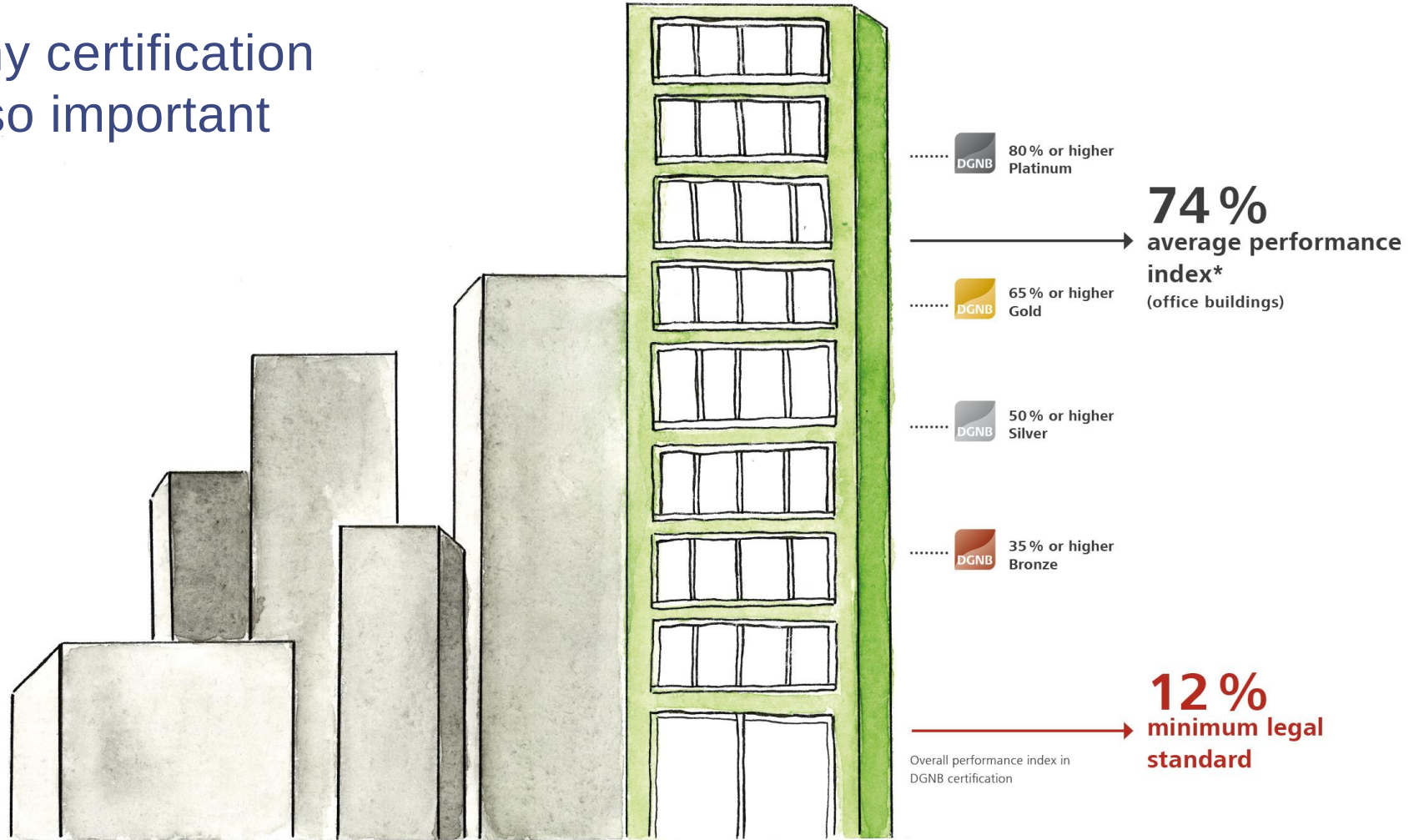
The DGNB System new buildings



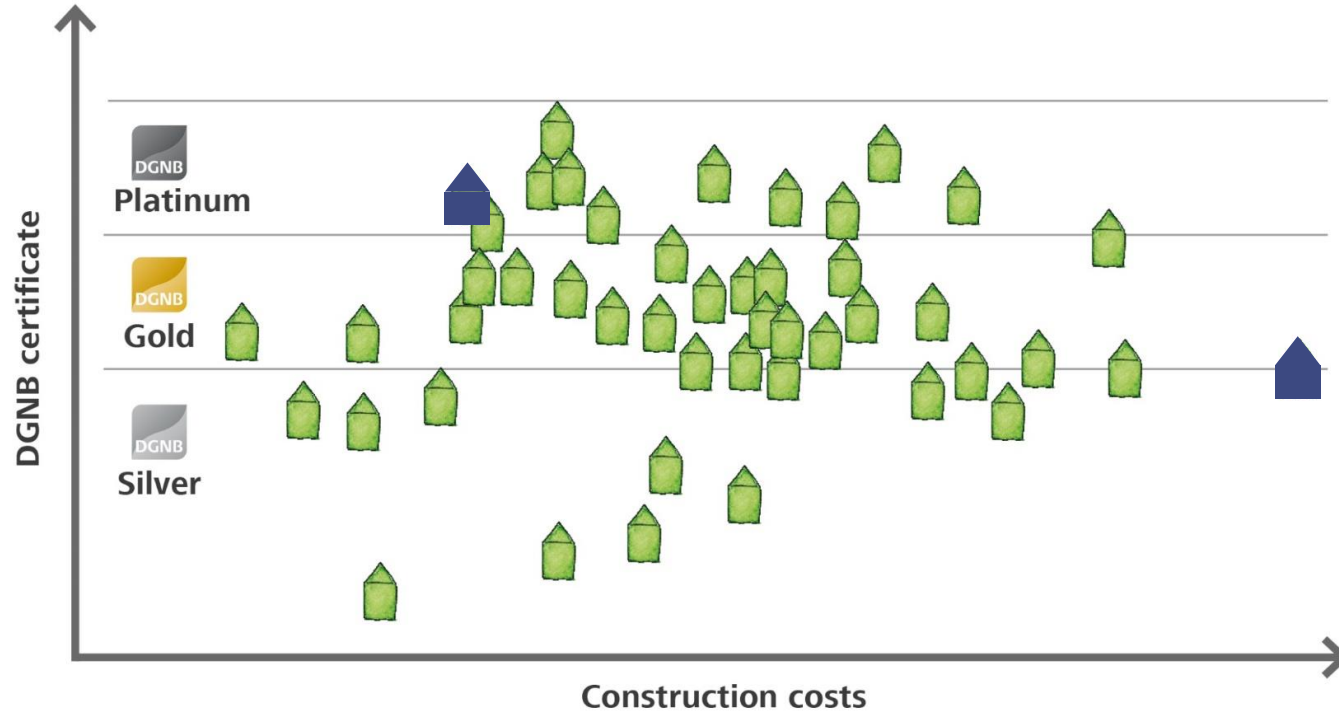
Sustainable finance taxonomy Regulation (EU) 2020/852



Why certification is so important



Sustainability pays off – added value and quality



Added value – sustainable real estate

Higher rents, market value, stable value, attractiveness for customers and employees, well-being, productivity, brand image, ability to learn, reputation ...

- Up to 7% increase in the value of buildings
- Up to 12% higher rents for certified neighborhood projects



Framework for carbon neutral buildings and sites

Calculation rules for the new building LCA

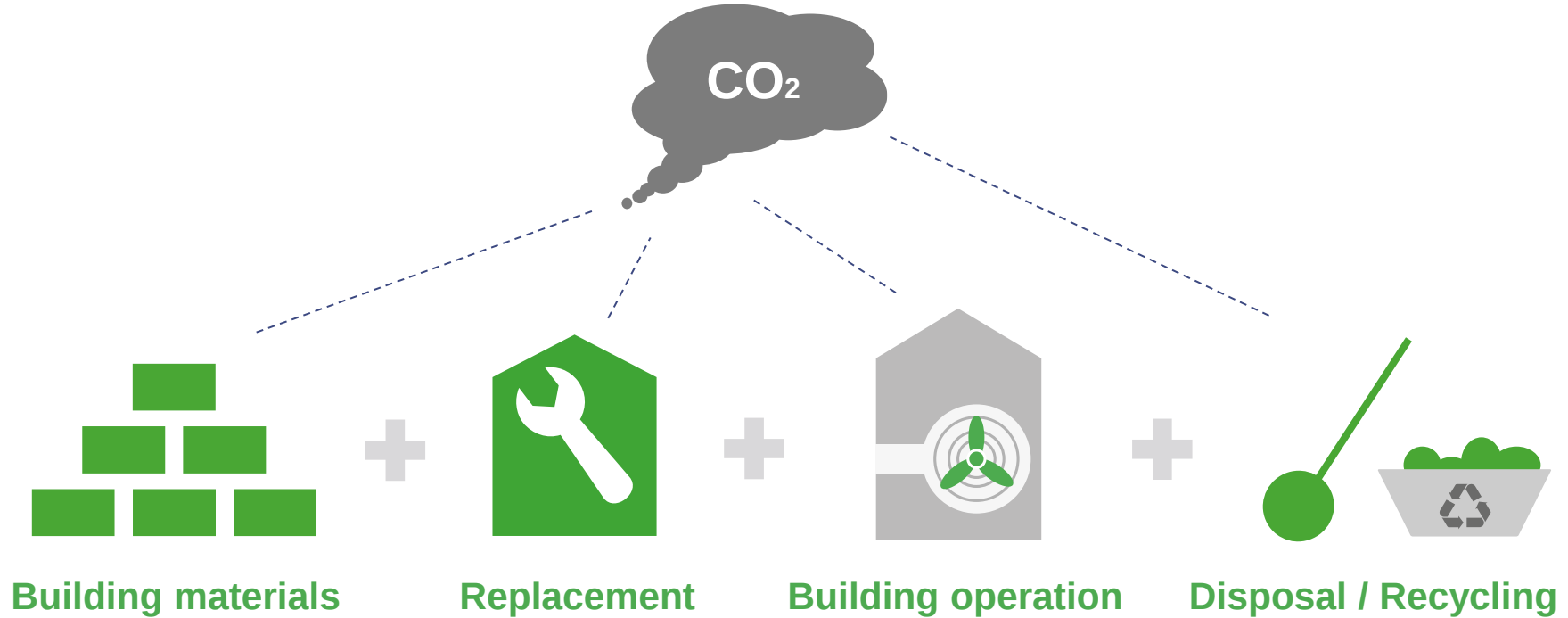
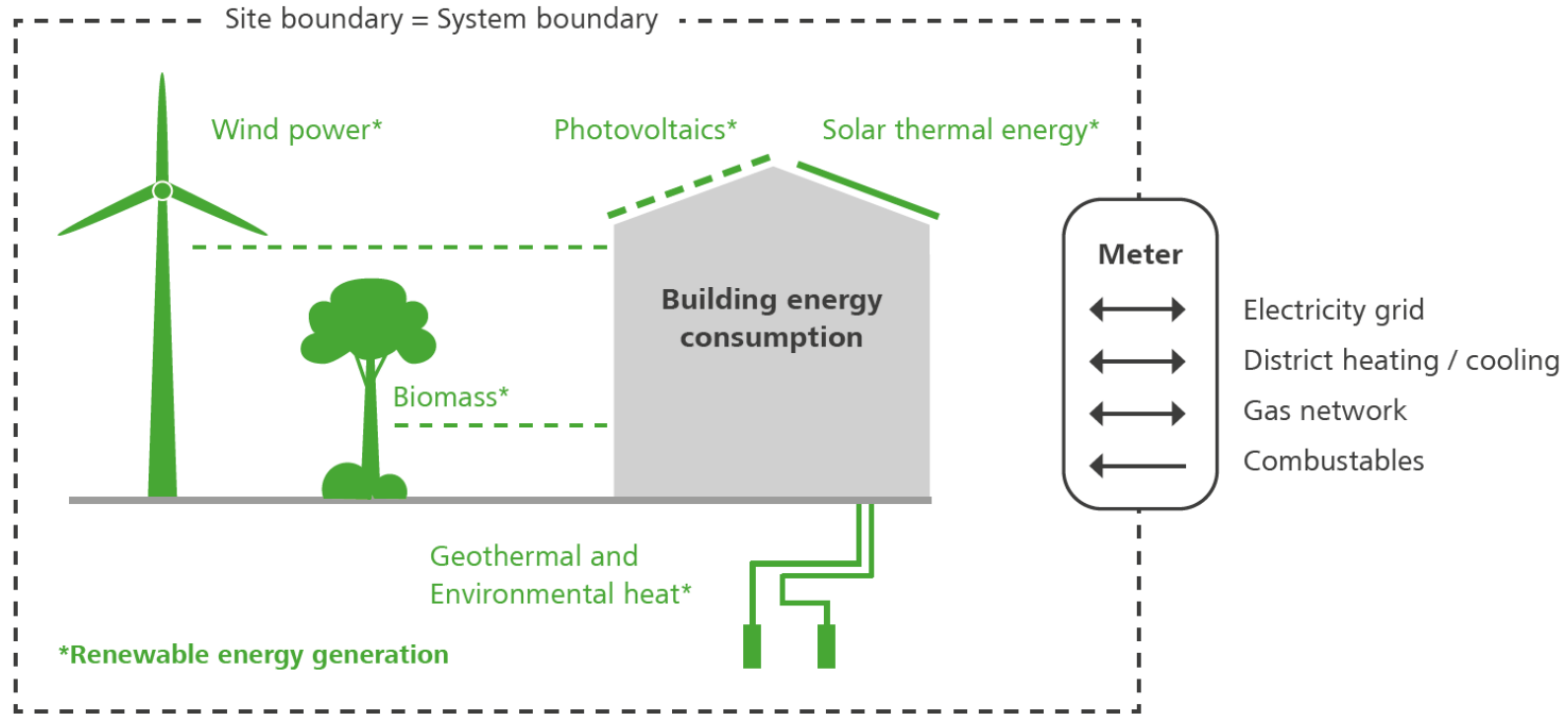
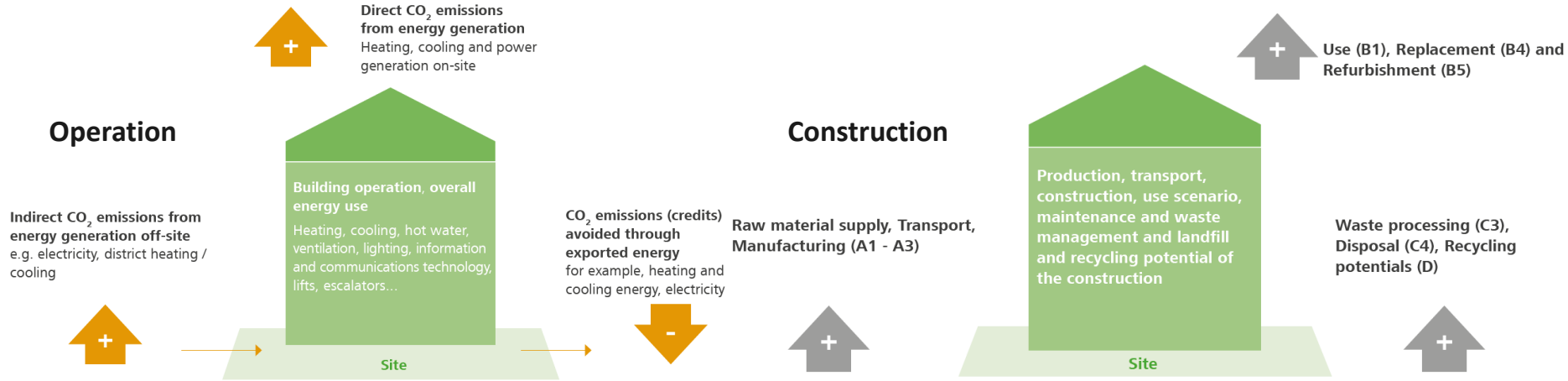


Illustration of the system boundaries for building operation



Framework

for carbon neutral buildings and sites

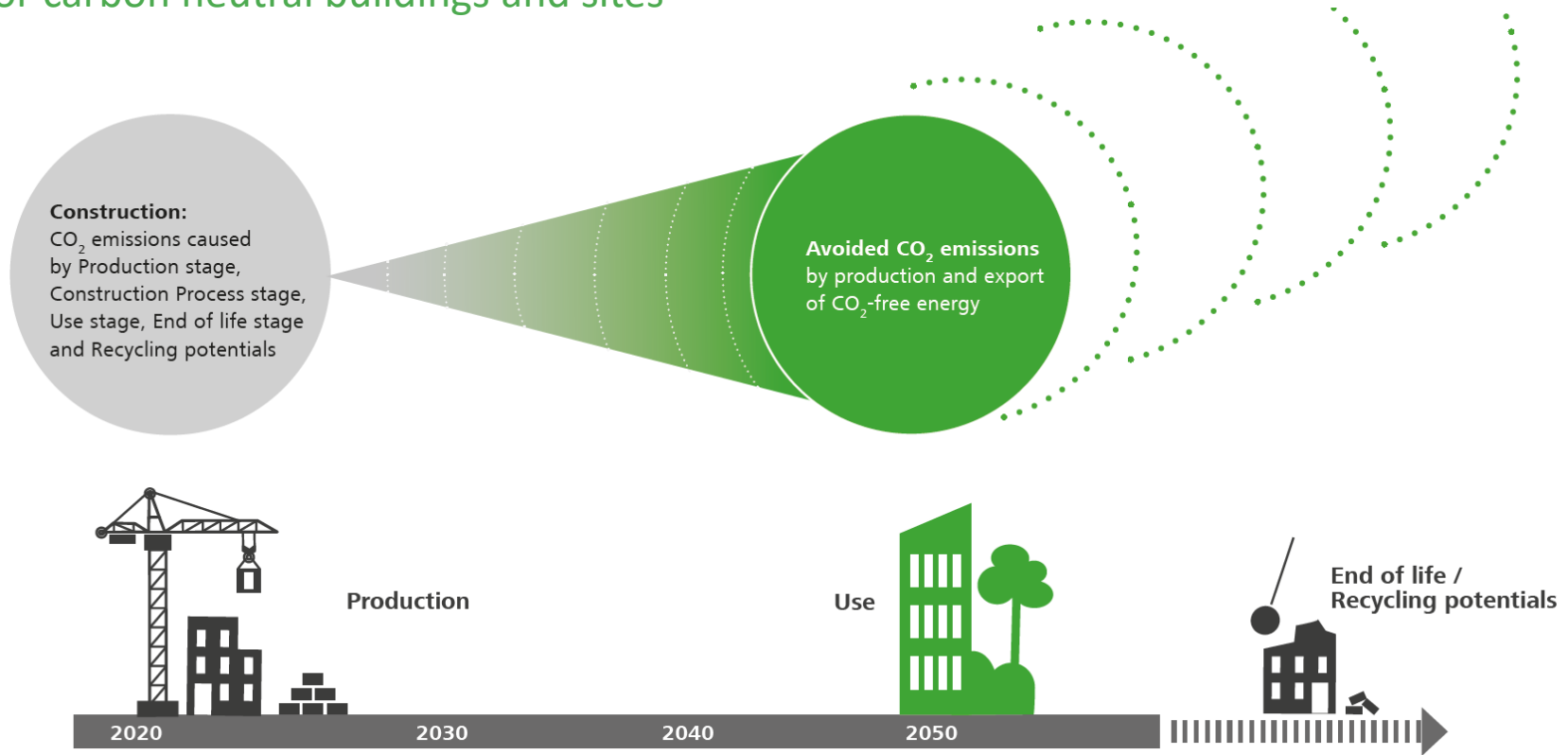


$$GHG_{abs,B} = \sum_j Q_{f,imp,j} \times f_{THG,j} - \sum_j Q_{f,exp,j} \times f_{THG,j}$$

Calculation of the absolute annual greenhouse gas emissions

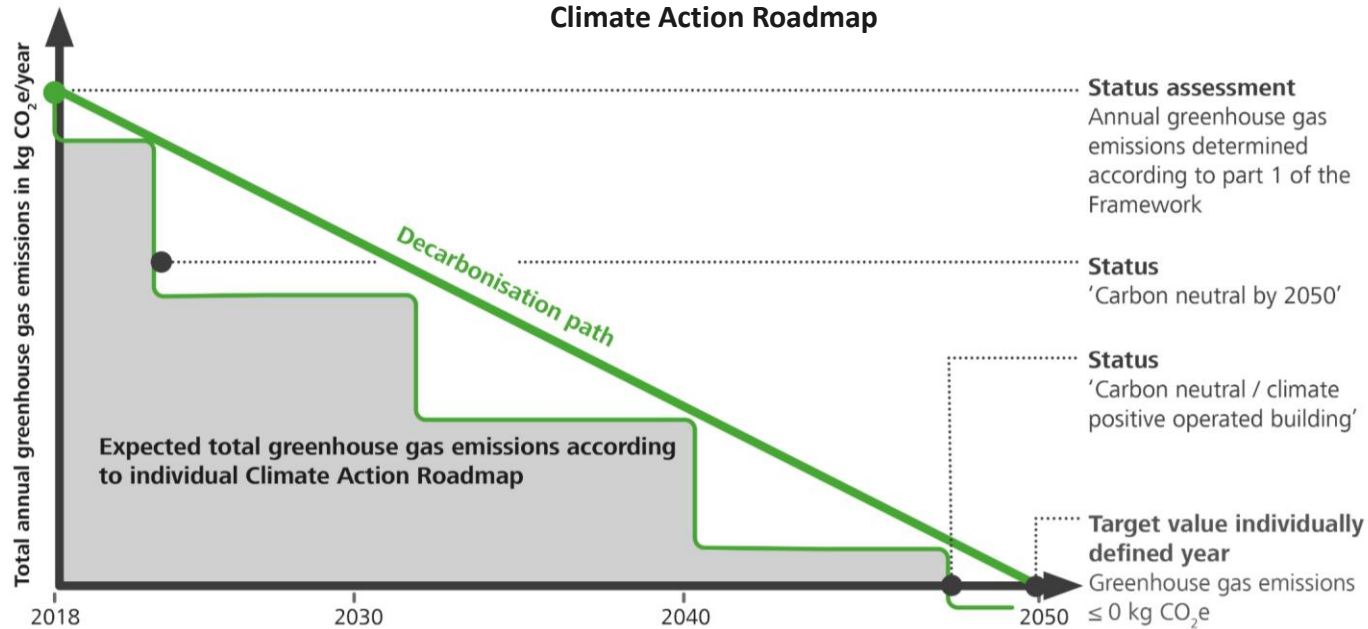
Framework

for carbon neutral buildings and sites



Framework

for carbon neutral buildings and sites



Decarbonisation path =
actual CO₂ budget available to a building over time

LCA optimization potential for planning and designing (districts & buildings)



Focus area 1 **High area sufficiency**

Optimisation of the areas required for use and multi-use of areas



Focus area 2 **Circular construction**

Optimisation of the traceability of the materials used in cycles



Focus area 3 **Flexible use**

Optimisation of the adaptability to other building uses as well as design of the lifespan of components for their use



Focus area 4 **Low material consumption**

Optimisation and reduction of the required materials from a life cycle perspective



Focus area 5 **Low CO₂ intensity of materials**

Optimisation and reduction of CO₂ intensity of components and materials

LCA optimization potential for operation phase (districts & buildings)



Focus area 1 **Local context**

Optimisation of local context for daylighting potential and solar exposure



Focus area 2 **Building energy**

Optimisation of building services and envelope, for low energy use



Focus area 3 **User energy**

Optimisation of plug loads and process loads for low energy use



Focus area 4 **Supply systems**

Optimisation of supply systems for high efficiency



Focus area 5 **Renewable energy**

Optimisation of energy generation at the site (balanced imported vs. exported energy)

Projects certified by the DGNB



Active city house Frankfurt



DGNB Definition: Climate positive

Thus, there is a simple definition for a building with carbon neutral operation:

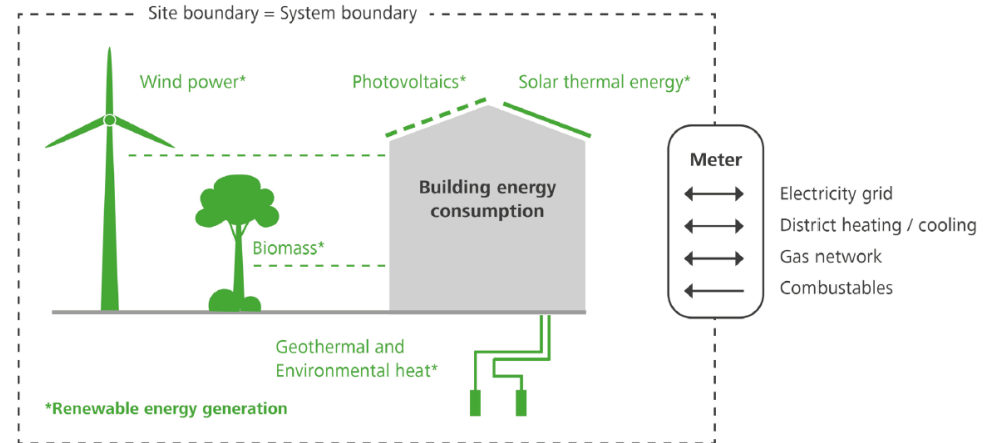
The annual balance of emissions emitted by building operation and emissions avoided by generation of CO₂-free energy exported off site is zero or less than zero.

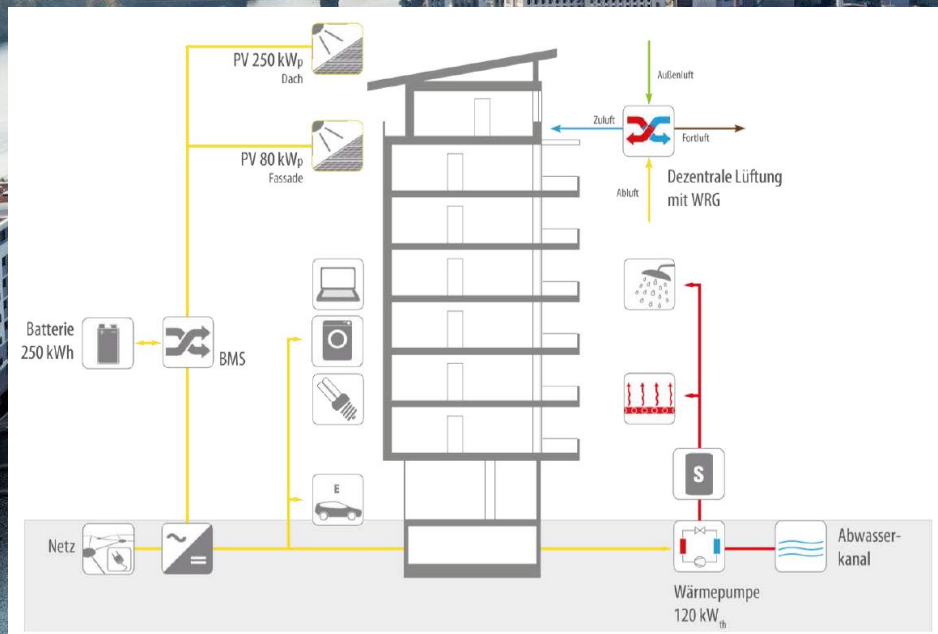


FUNDAMENTAL ELEMENTS OF THE DGNB DEFINITION FOR THE CARBON NEUTRALITY OF BUILDINGS:

- Goal is a CO₂ balance of 0 or <0 for all building types
- User electricity (so-called plug loads) must also be taken into account
- All energy sources are considered with the CO₂ emissions actually caused
- No compensation measures to offset CO₂ emissions

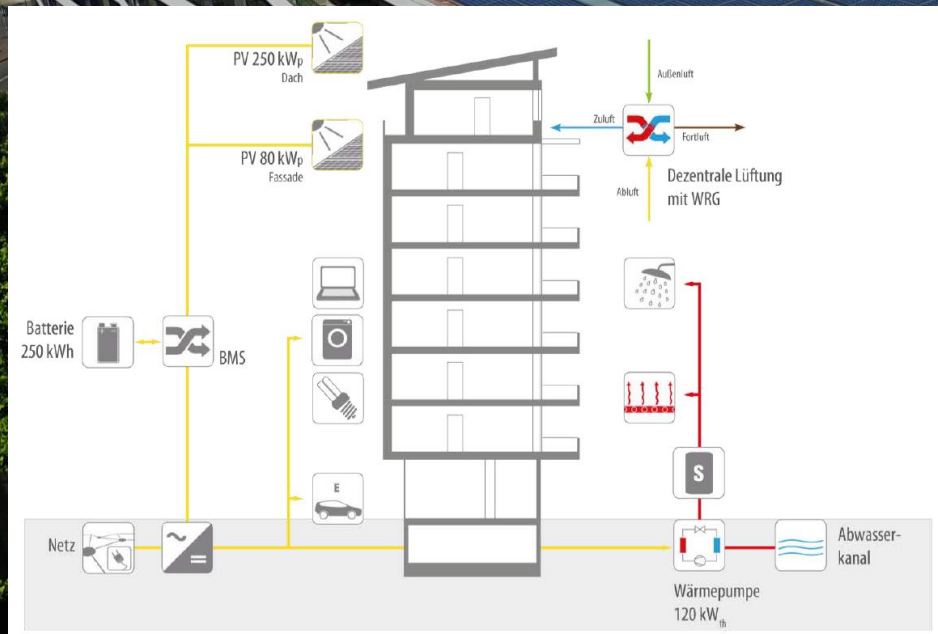
Illustration of the system boundaries for building operation



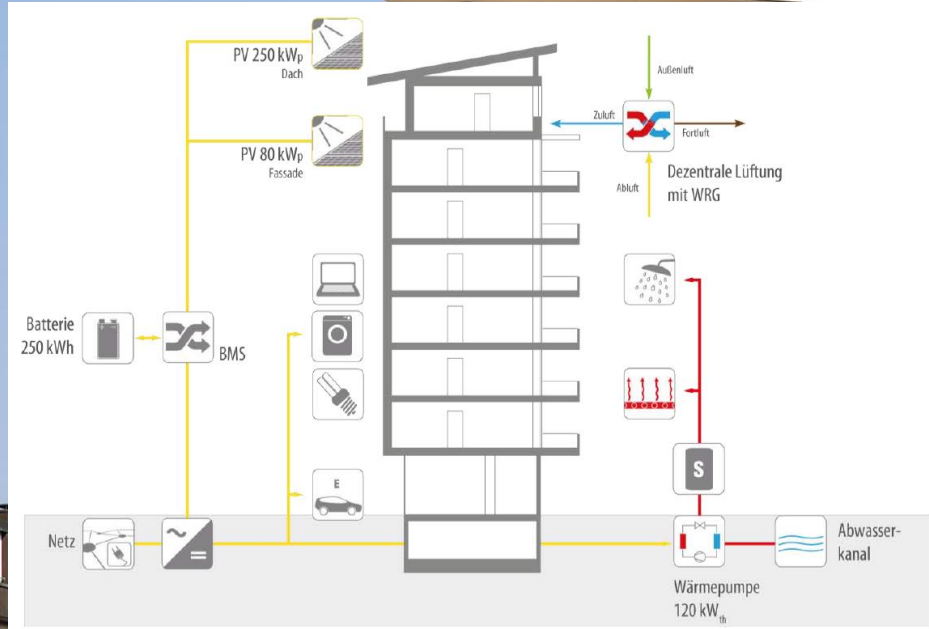


Active city house Frankfurt



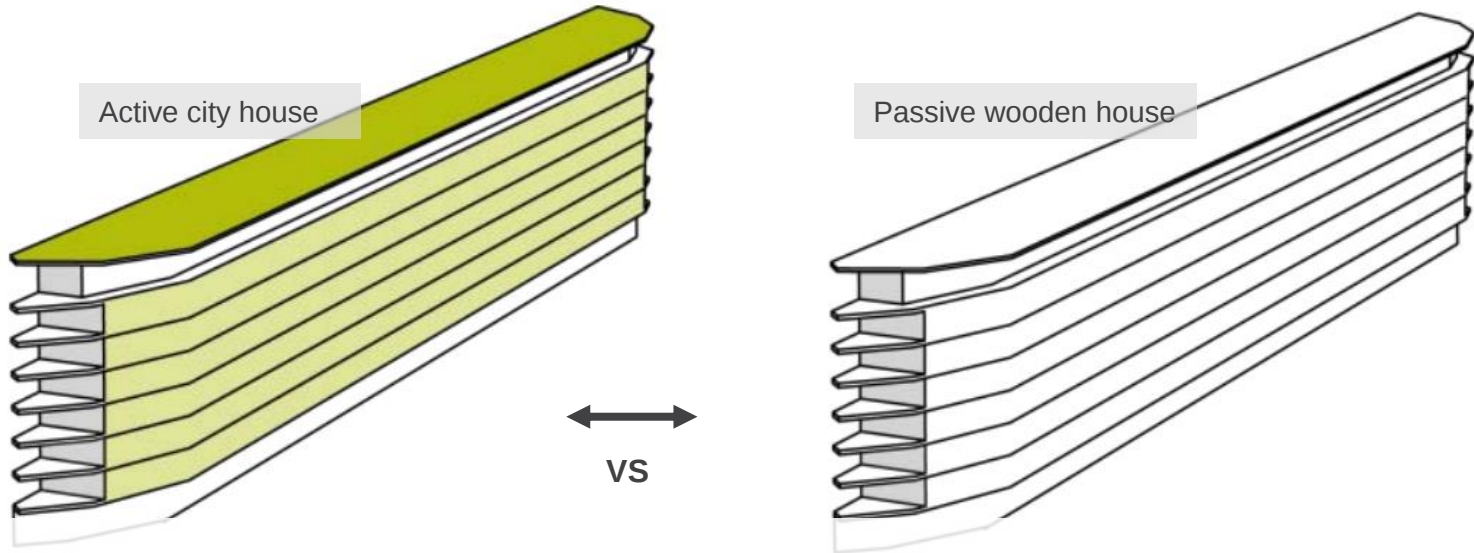


Active city house Frankfurt



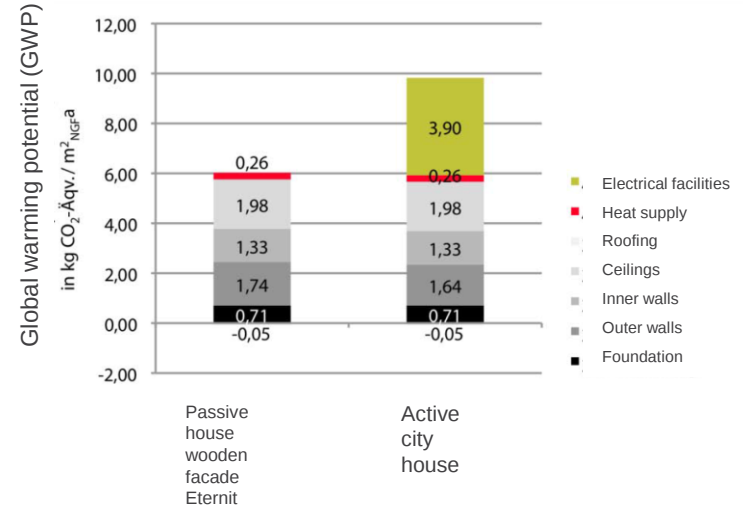
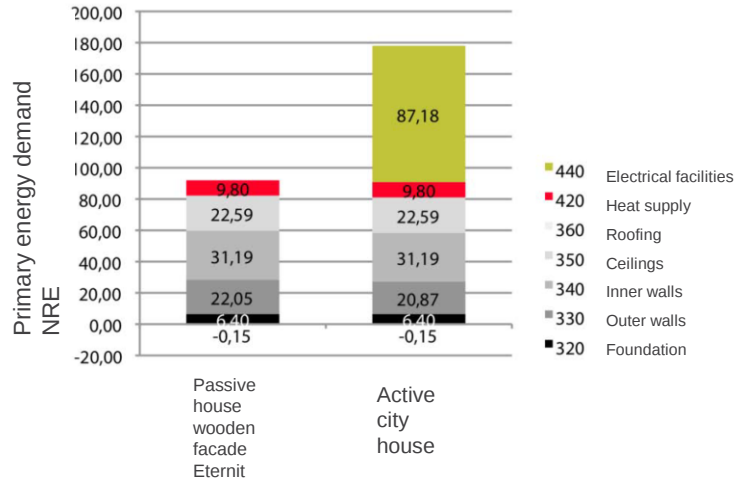
Active city house Frankfurt

Active city house Frankfurt



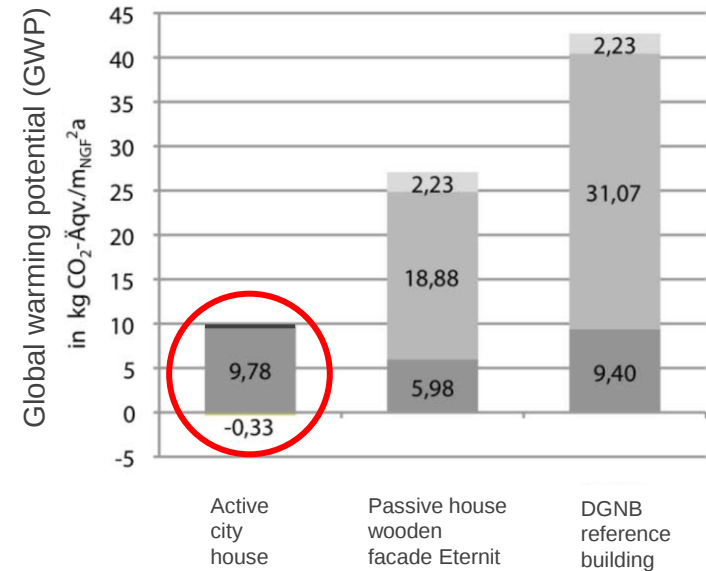
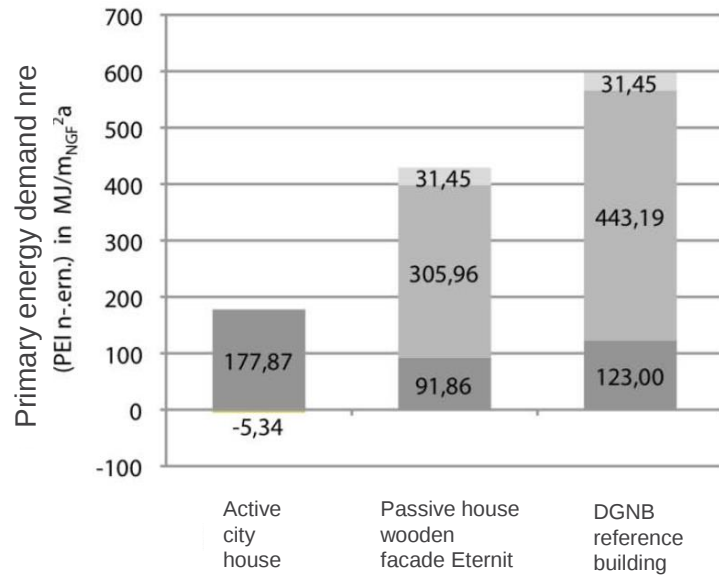
LCA in use: comparison of building construction
and operation for two design versions

LCA comparison PE_{nre} and GWP for construction



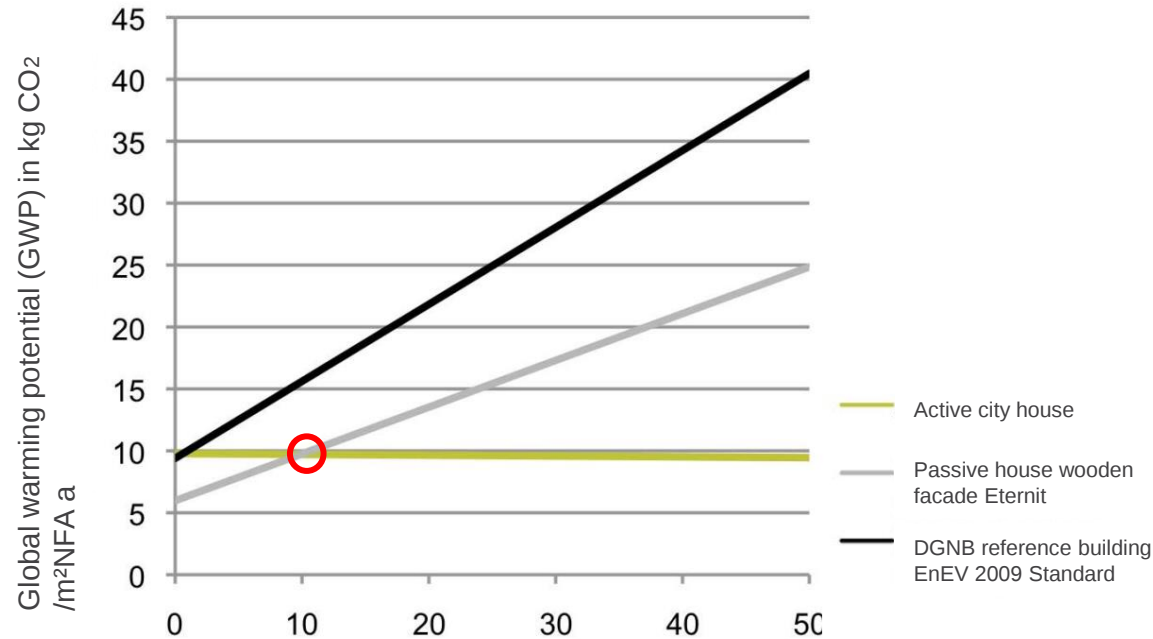
LCA comparison PE_{nre} and GWP

for construction and operation phase



LCA comparison PE_{nre} and GWP

for construction and operation phase



LCA in use: comparison of building construction and operation for two design versions



Climate
Positive

Eisbärhaus Bauteil A + B
Kirchheim Teck
Mixed Use

1556 kg CO₂

Indirect CO₂ emissions from
energy generation off-site
e.g. electricity, district heating /
cooling



Building operation, overall
energy use
Heating, cooling, hot water,
ventilation, lighting, information
and communications technology,
lifts, escalators...

-11637 kg CO₂

CO₂ emissions (credits)
avoided through
exported energy
for example, heating and
cooling energy, electricity



Site



Climate
Positive

Eisbärhaus Bauteil A + B
Kirchheim Teck
Mixed Use

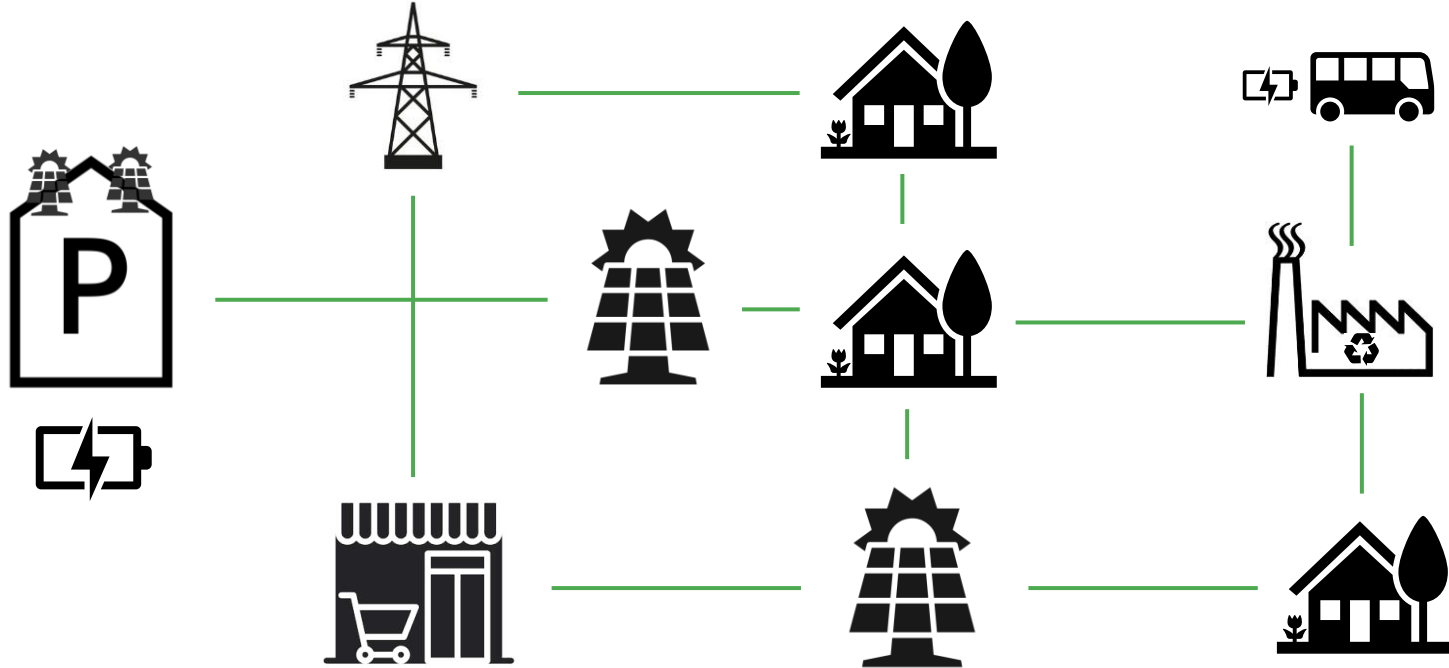


Climate
Positive

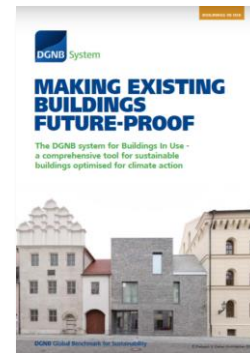
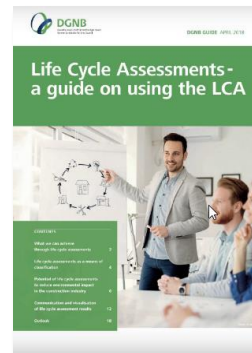
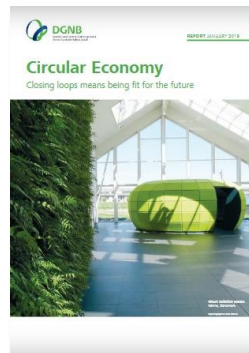
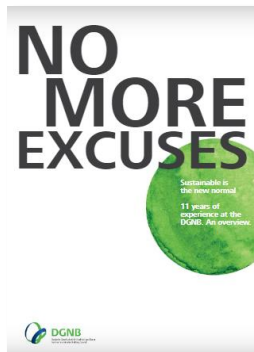
Eisbärhaus Bauteil A + B
Kirchheim Teck
Mixed Use

Minimise energy demand by networking

- energy storage system
- use of waste heat
- flexible energy management
- connect different sectors



DGNB Publications



www.dgnb.de/en/council/publications/

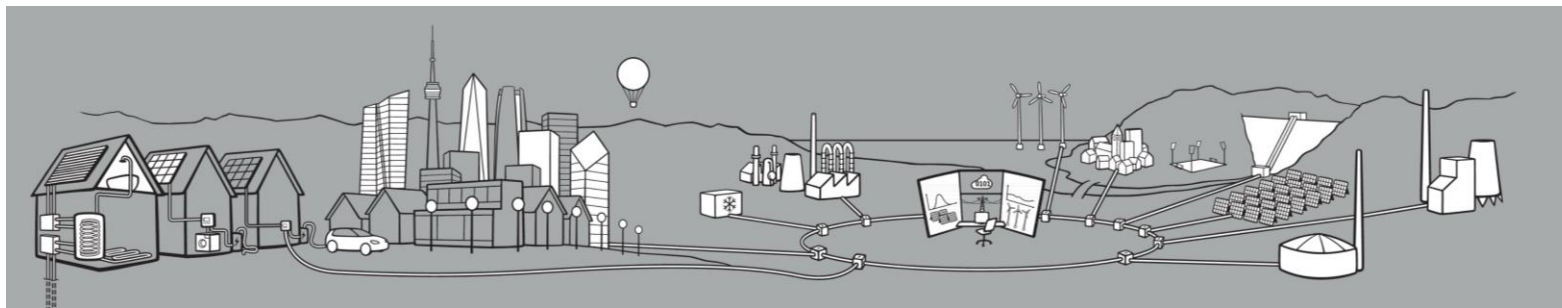
Thank you for your attention!

Levan Ekhvaia

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Federal Ministry
for Economic Affairs
and Climate Action



MITTELSTAND
GLOBAL
ENERGY SOLUTIONS
MADE IN GERMANY

Facilitator



eclareon