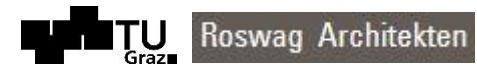
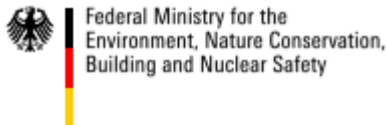


World Sustainable Built Environment Conference 2017 Hong Kong
Transforming Our Built Environment through Innovation and Integration:
Putting Ideas into Action
5-7 June 2017

Special Session

**Sustainability Assessment of Buildings -
Austrian and Swiss Application Experience**



INNOVATIVE PUBLIC PROCUREMENT

Innovative processes and practices

E-Procurement Startups Growth & jobs

User-friendly public administration Simplified processes

http://ec.europa.eu/growth/tools-databases/newsroom/cf/_getimage.cfm?doc_id=8405



- In Europe, public authorities spend more than 16% of EU's GDP
 - – nearly **1.8 Trillion Euros** –
 - = Euros 57.000 / second *1 year
-
- buying goods
 - office equipment and
 - building components
 - purchase services
 - buildings maintenance
 - and transport services





- Cleaning products and services
- Combined Heat and Power (CHP)
- Electricity
- Furniture
- Indoor lighting
- Office Building Design, Construction and Management
- Sanitary Tapware
- Toilets and Urinals
- Wall Panels
- Water-based Heaters
-



Source: http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

Procurement stages

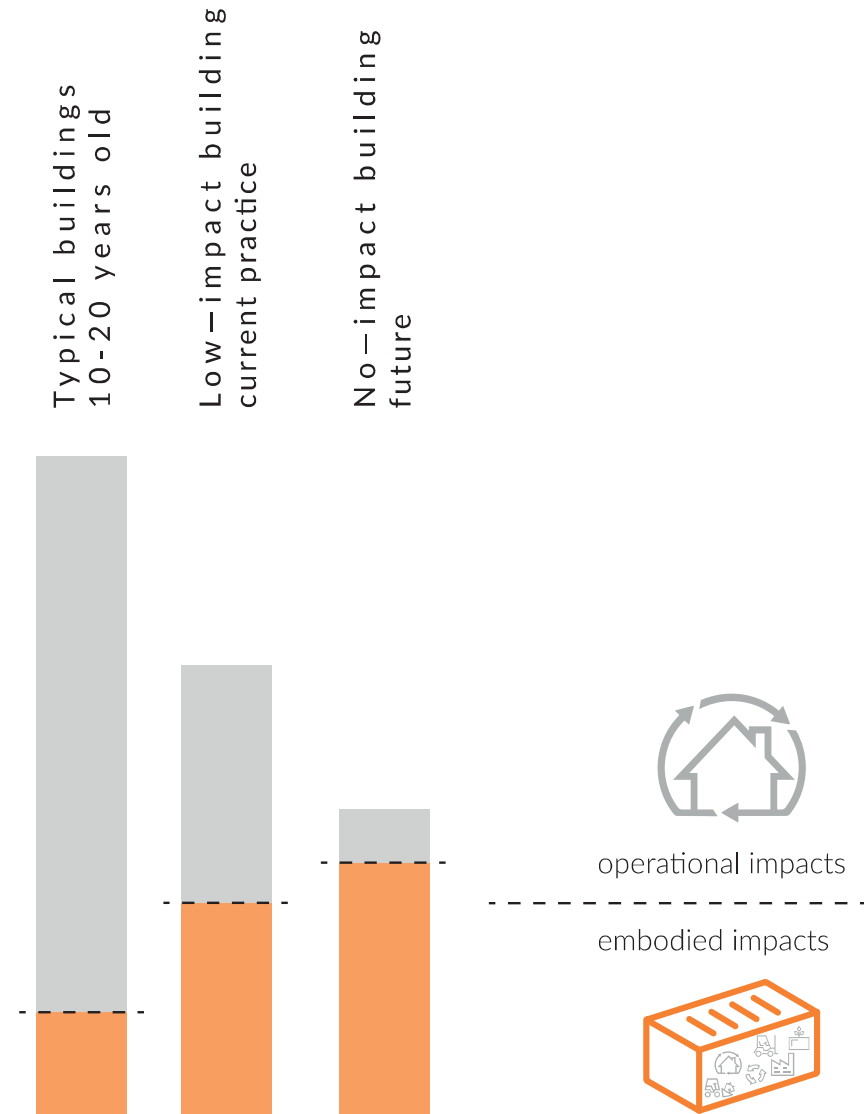
- A. Selection of the design team and contractors
- B. Detailed design and performance requirements
- C. Strip-out, demolition and site preparation works
- D. Construction of the building or major renovation works
- E. Installation of energy systems or the supply of energy services
- F. Completion and handover
- G. Facilities management



Brussels, 20.5.2016
SWD(2016) 180 final

The most significant environmental impacts of office buildings

- Energy use during their occupation
- Production of construction products
- Transportation of construction products
- Lifespan of the building and its elements
- Healthy and attractive working environment



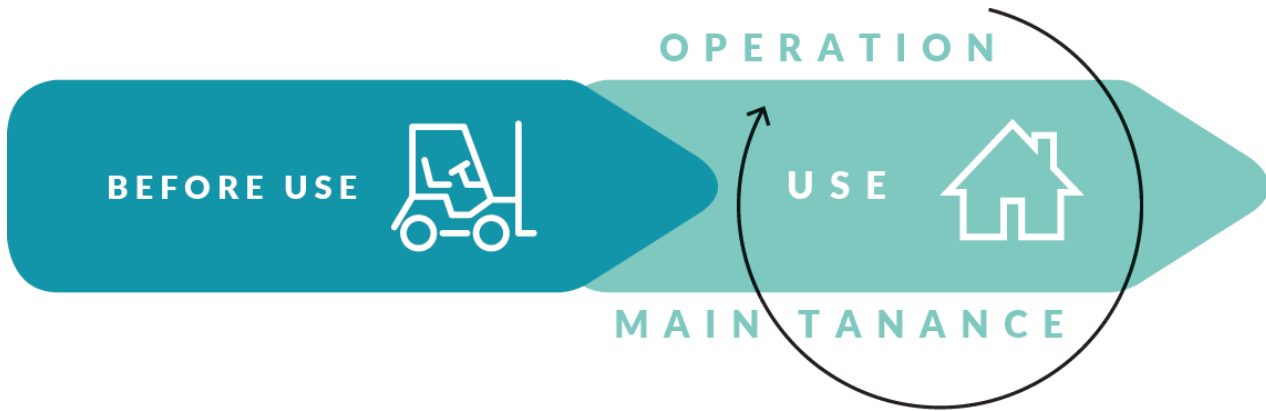
The principals of sustainability





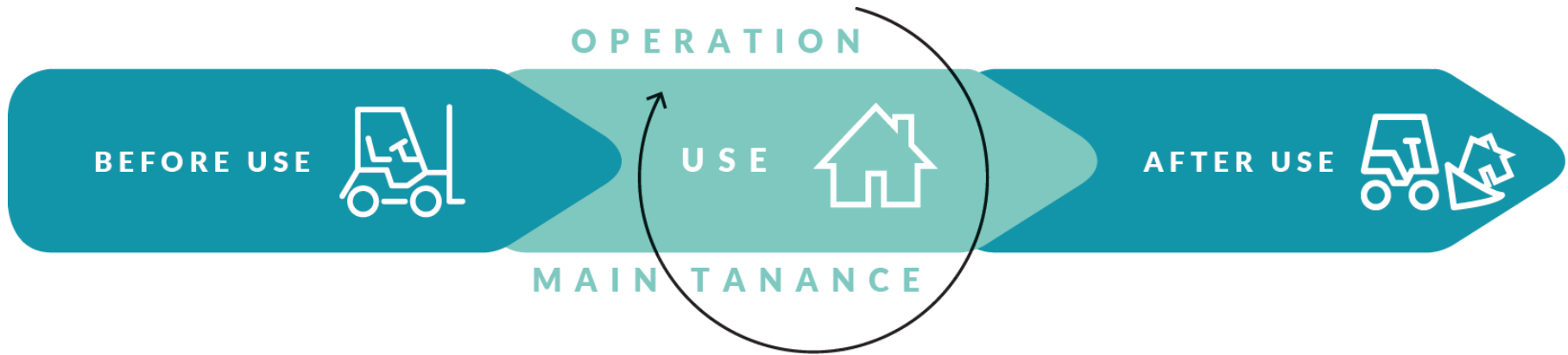
Source: AGNHB, TU Graz





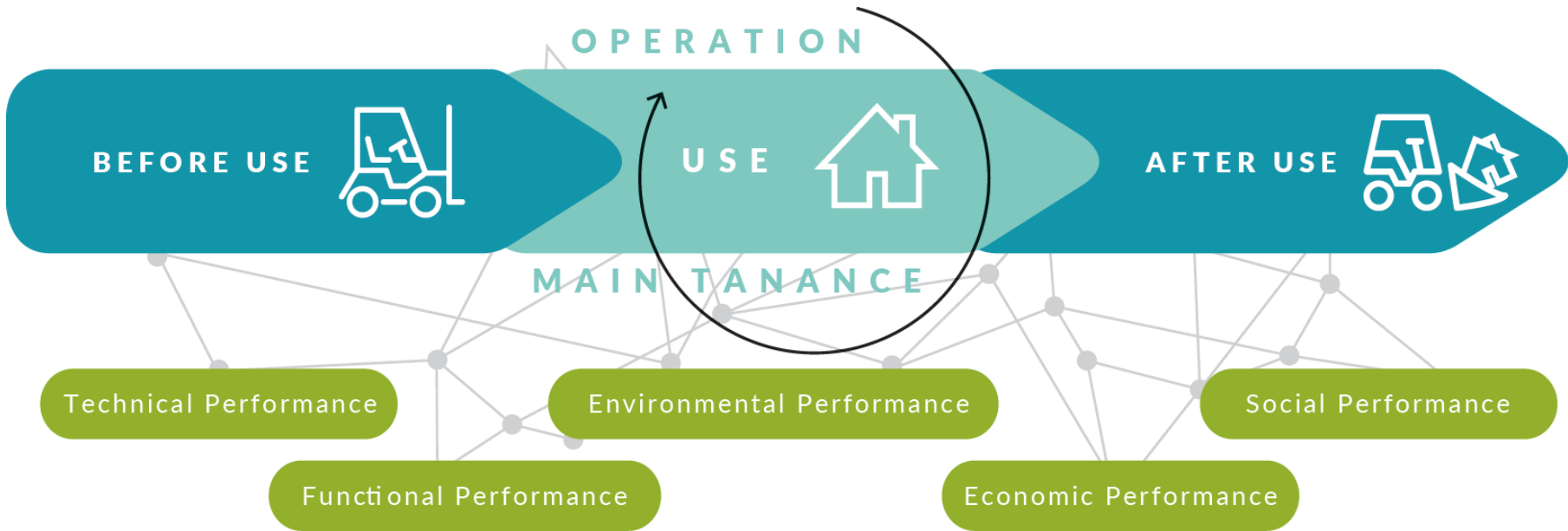
Source: AGNHB, TU Graz





Source: AGNHB, TU Graz





Source: AGNHB, TU Graz

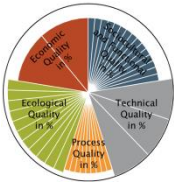


What is a sustainable building ?



Green and sustainability labels

BREEAM



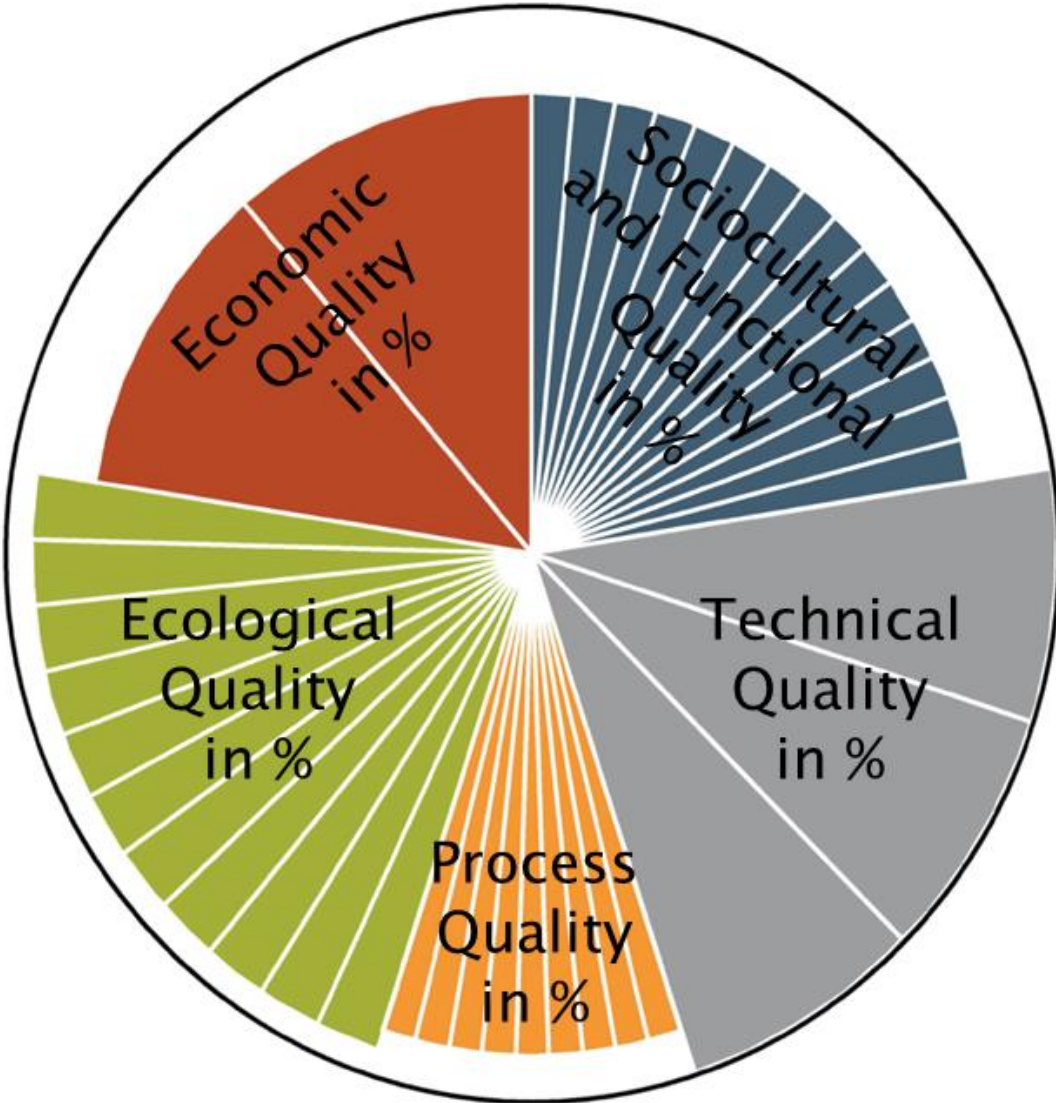
Source: AGNHB, TU Graz



■ Goal Definition



Quelle: <http://www.p3-coachingkompetenz.de/grundlagen-und-honorar.php>



You can't manage
what you don't measure



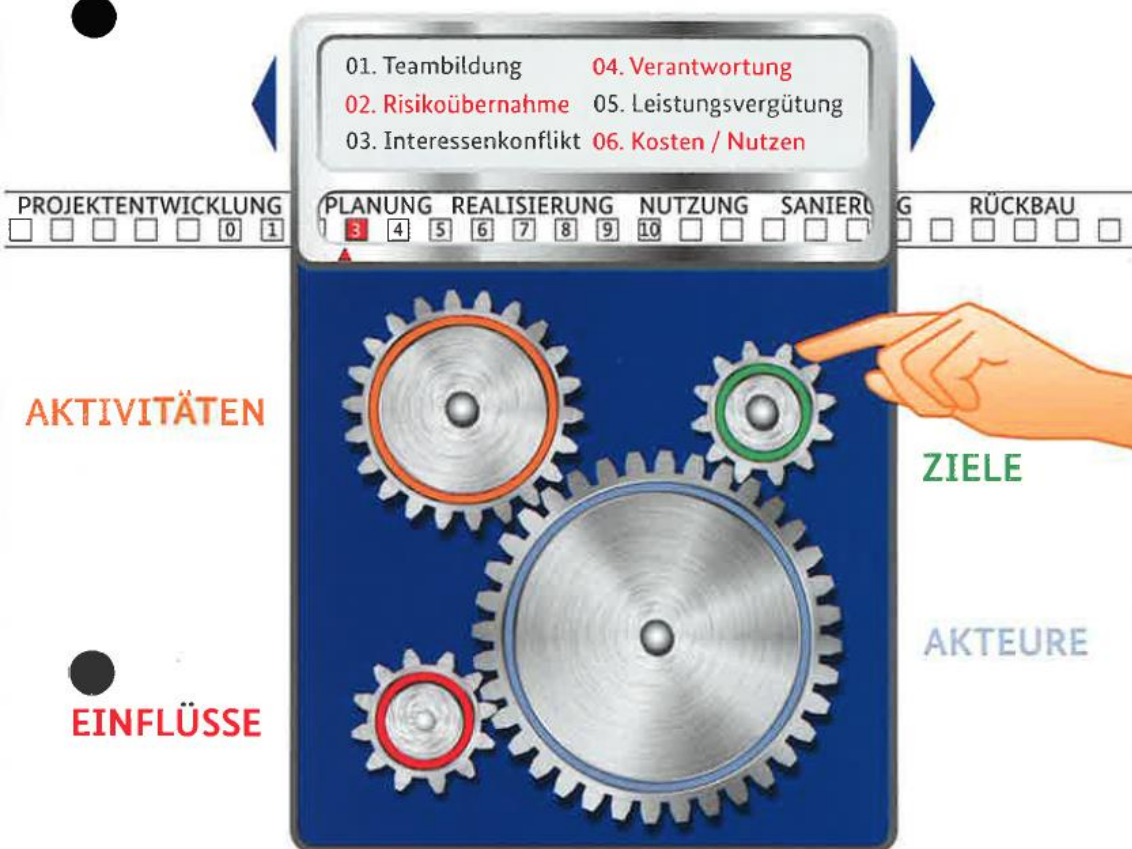
Peter Drucker



Sustainability Criteria	Percentage Share of overall Result Individual Categories	Factors of Relevance	Percentage Share of overall Result Main Criteria Groups
Ecological Quality			22,5%
Effects on Global and Local Environment			
1.1.1 Global Warming Potential (GWP)	3,375%	3	
1.1.2 Ozone Depletion Potential (ODP)	1,125%	1	
1.1.3 Photochemical Ozone Creation Potential (POCP)	1,125%	1	
1.1.4 Acidification Potential (AP)	1,125%	1	
1.1.5 Eutrophication Potential (EP)	1,125%	1	
1.1.6 Risks to the Local Environment	3,375%	3	
1.1.7 Sustainable Logging / Wood	1,125%	1	
Demand of Resources			
1.2.1 Primary Energy Demand Not Renewable (PE _{nr})	3,375%	3	
1.2.2 Total Primary Demand (PE _{tot}) and Amount of PE _{nr}	2,250%	2	
1.2.3 Fresh Water Demand and Quantity of Wastewater	2,250%	2	
1.2.4 Demand of Space	2,250%	2	
Economical Quality			22,5%
Life Cycle Costs			
2.1.1 Building-related Life Cycle Costs	13,500%	3	
Performance			
2.2.1 Stability of Value	9,000%	2	
Socio-Cultural and Functional Quality			22,5%
Health, Comfort and User Satisfaction			
3.1.1 Thermal Comfort in Winter	1,607%	2	
3.1.2 Thermal Comfort in Summer	2,411%	3	
3.1.3 Indoor Air Quality	2,411%	3	
3.1.4 Acoustic Comfort	0,804%	1	
3.1.5 Visual Comfort	2,411%	3	
3.1.6 Influence of the User	1,607%	2	
3.1.7 Building-related Outdoor Qualities	0,804%	1	
3.1.8 Safety and Incident Risks	0,804%	1	
Functionality			
3.2.1 Barrier-free Building	1,607%	2	
3.2.2 Space Efficiency	0,804%	1	
3.2.3 Capability of Conversion	1,607%	2	
3.2.4 Public Accessibility	1,607%	2	
3.2.5 Bicycle Comfort	0,804%	1	
Ensuring Design Quality			
3.3.1 Design and urban Quality	2,411%	3	
3.3.2 Art in Architecture	0,804%	1	
Technical Quality			22,5%
Technical Execution			
4.1.1 Sound Insulation	5,625%	2	
4.1.2 Heat Insulation and Protection against Condensate	5,625%	2	
4.1.3 Cleaning and Maintenance	5,625%	2	
4.1.4 Dismantling, Separation and Utilisation	5,625%	2	
Process Quality			10,0%
Management and Design			
5.1.1 Project Preparation	1,429%	3	
5.1.2 Integrated Design	1,429%	3	
5.1.3 Optimisation and Complexity of Planning	1,429%	3	
5.1.4 Sustainability Issues in Tender and Placing	0,952%	2	
5.1.5 Requirements for an Optimal Utilisation and Management	0,952%	2	
Building Construction			
5.2.1 Building Site / Building Process	0,952%	2	
5.2.2 Quality Assurance of the Building Construction	1,429%	3	
5.2.3 Controlled Commissioning	1,429%	3	
Location Profile			0,0%
Location Profile			
6.1.1 Risks at the Micro-Site	--	2	
6.1.2 Conditions at the Micro-Site	--	2	
6.1.3 Image and Character of Location and Quarter	--	2	
6.1.4 Public Transport Connections	--	3	
6.1.5 Vicinity to Use-Specific Services	--	2	
6.1.6 Supply Lines / Site Development	--	2	



Complex situation

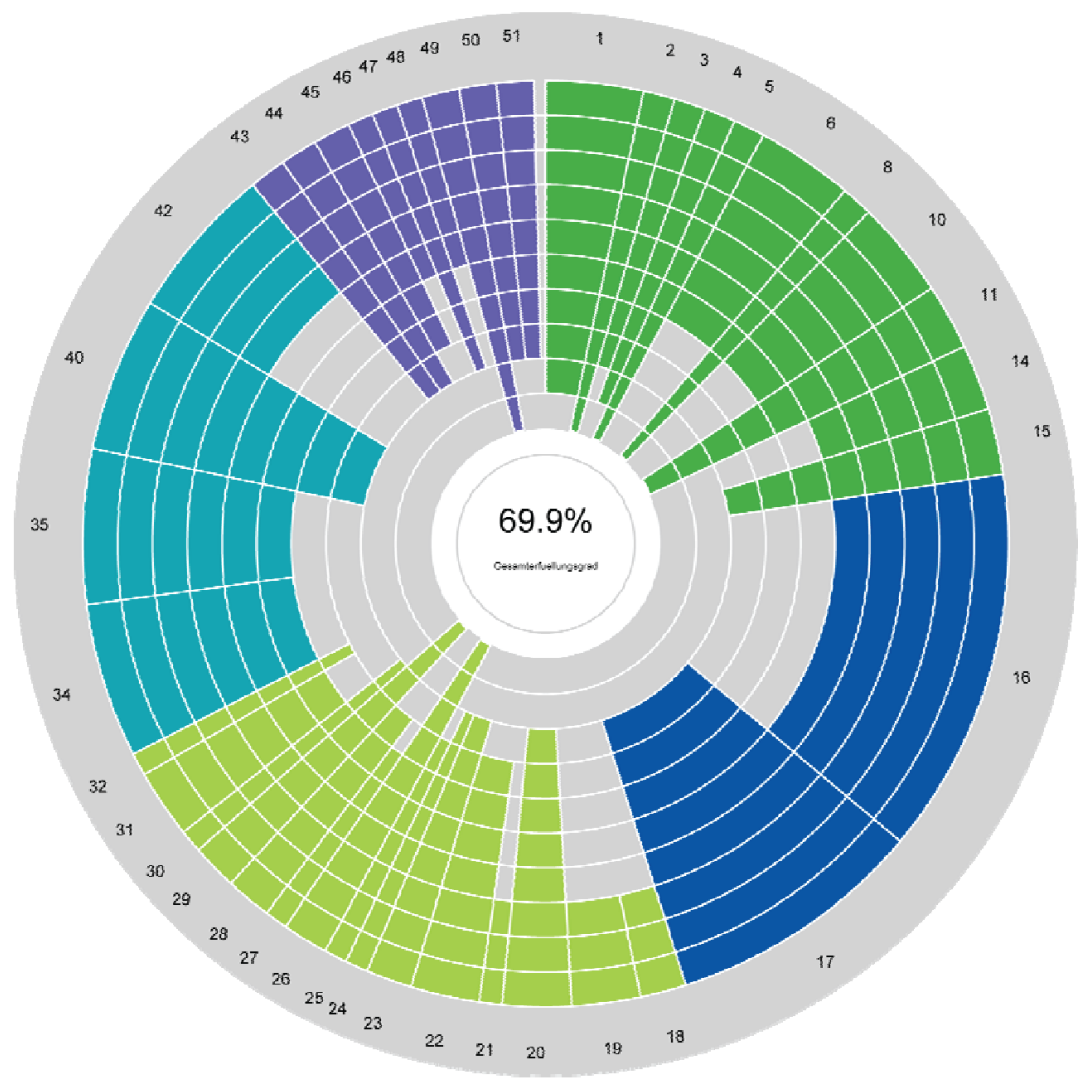


Quelle: <http://www.solidar-pw.de>

Quelle: vgl. Wilms 2012

- Numerous influencing factors
- High degree of crosslinking
- Diffuse goals and target conflicts
- Difficultly calculable risks
- Time pressure in decision-making
- Blurred knowledge
- Insufficient information

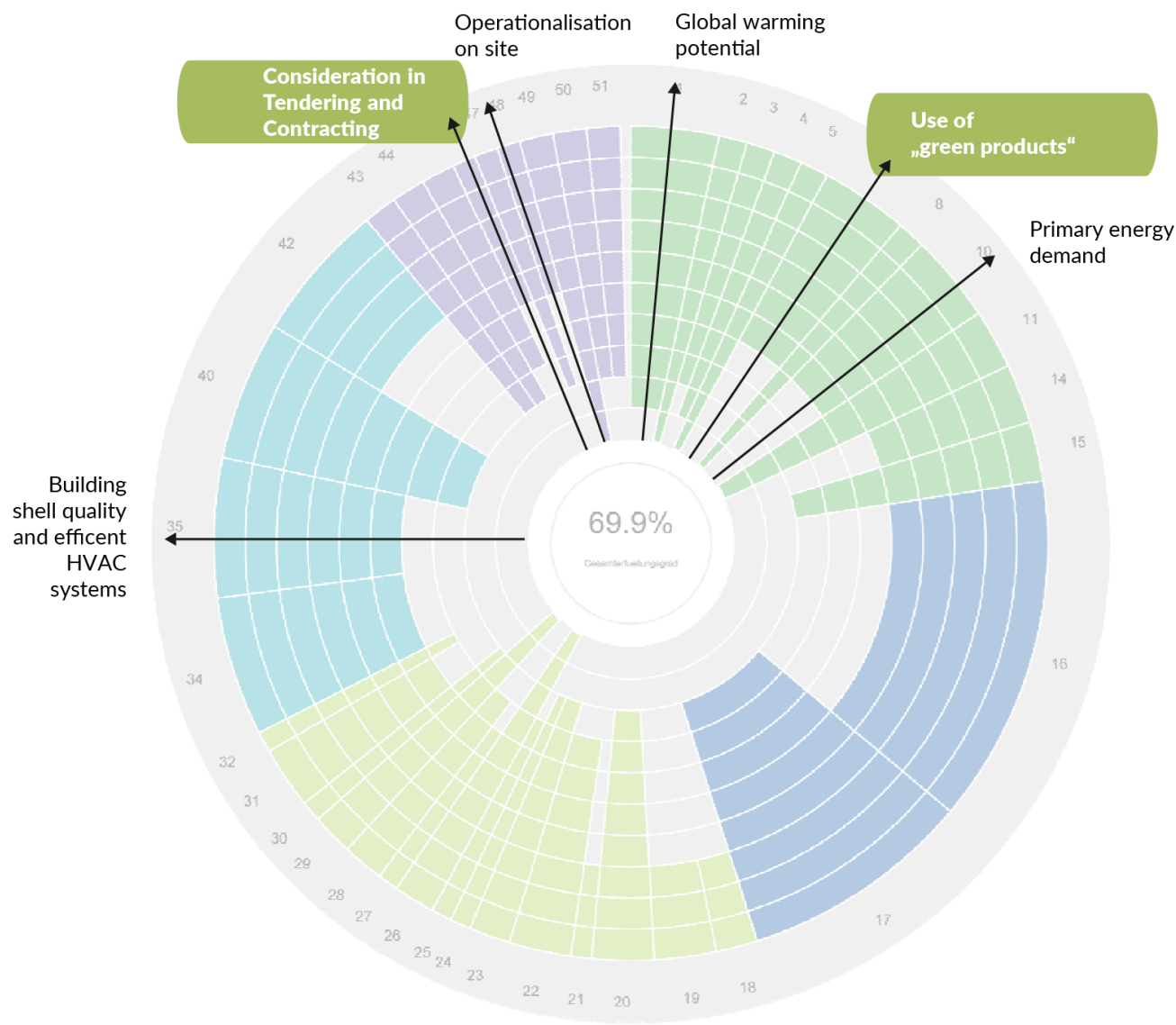




Source: AGNHB, TU Graz



Including individual stakeholder goals



Source: AGNHB, TU Graz

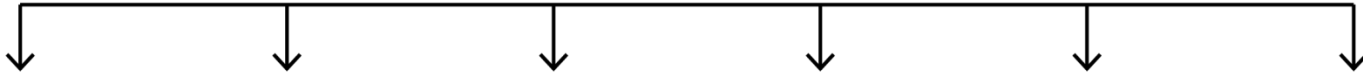


Integration in the building process



Integration in the building process

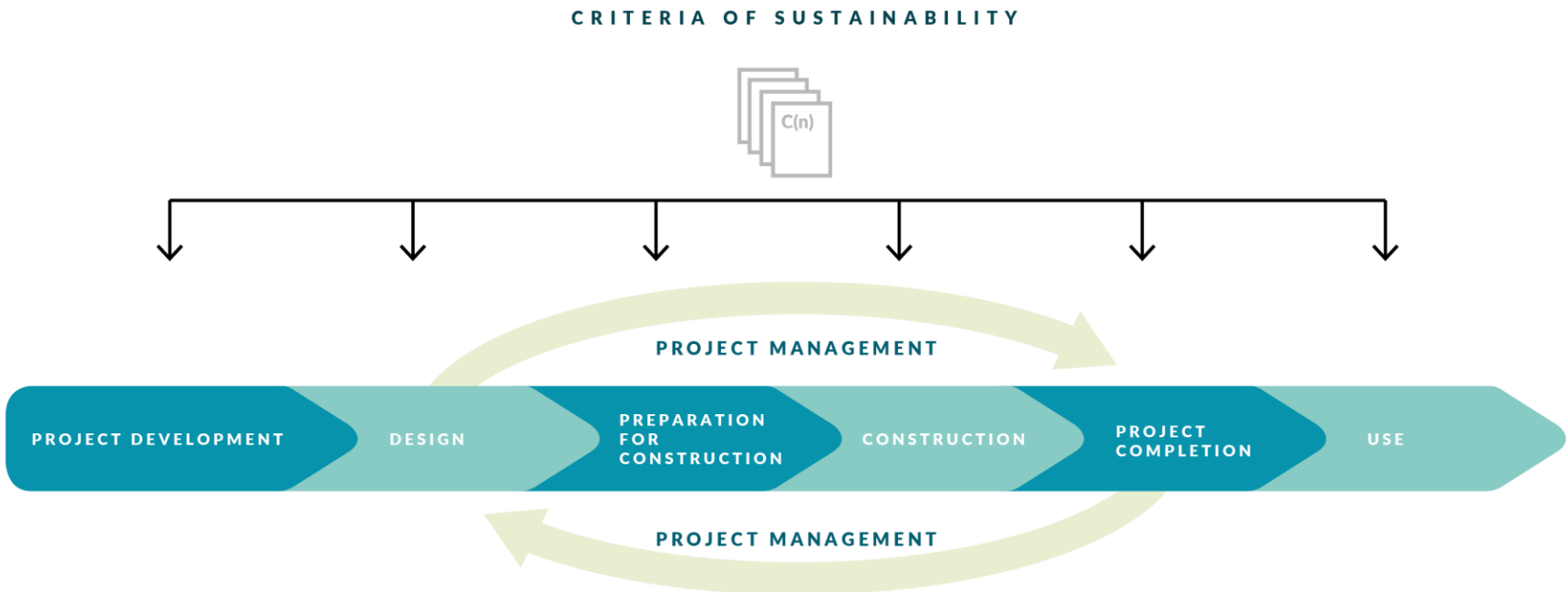
CRITERIA OF SUSTAINABILITY



Source: AGNHB, TU Graz



Integration in the building process

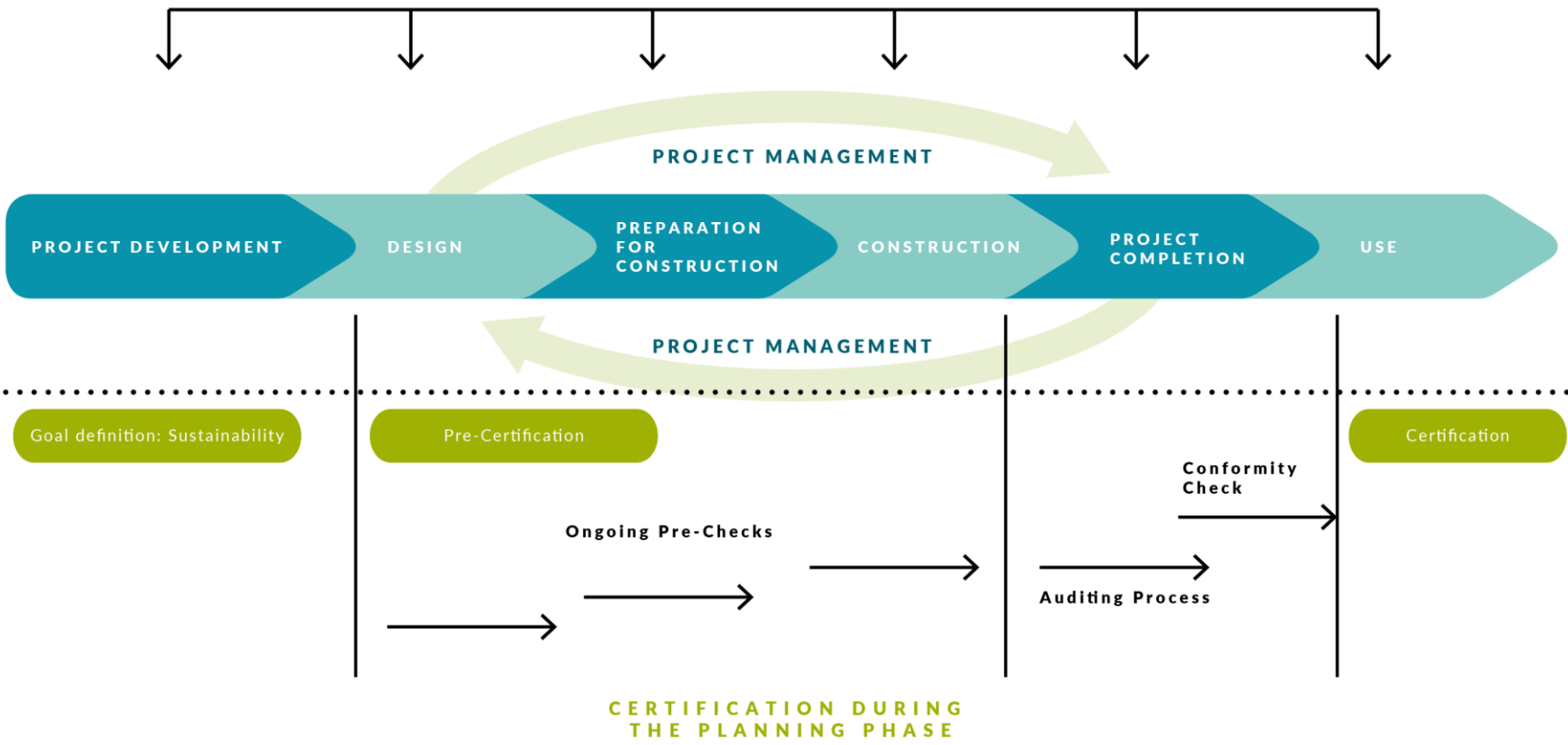


Source: AGNHB, TU Graz



Integration in the building process

CRITERIA OF SUSTAINABILITY



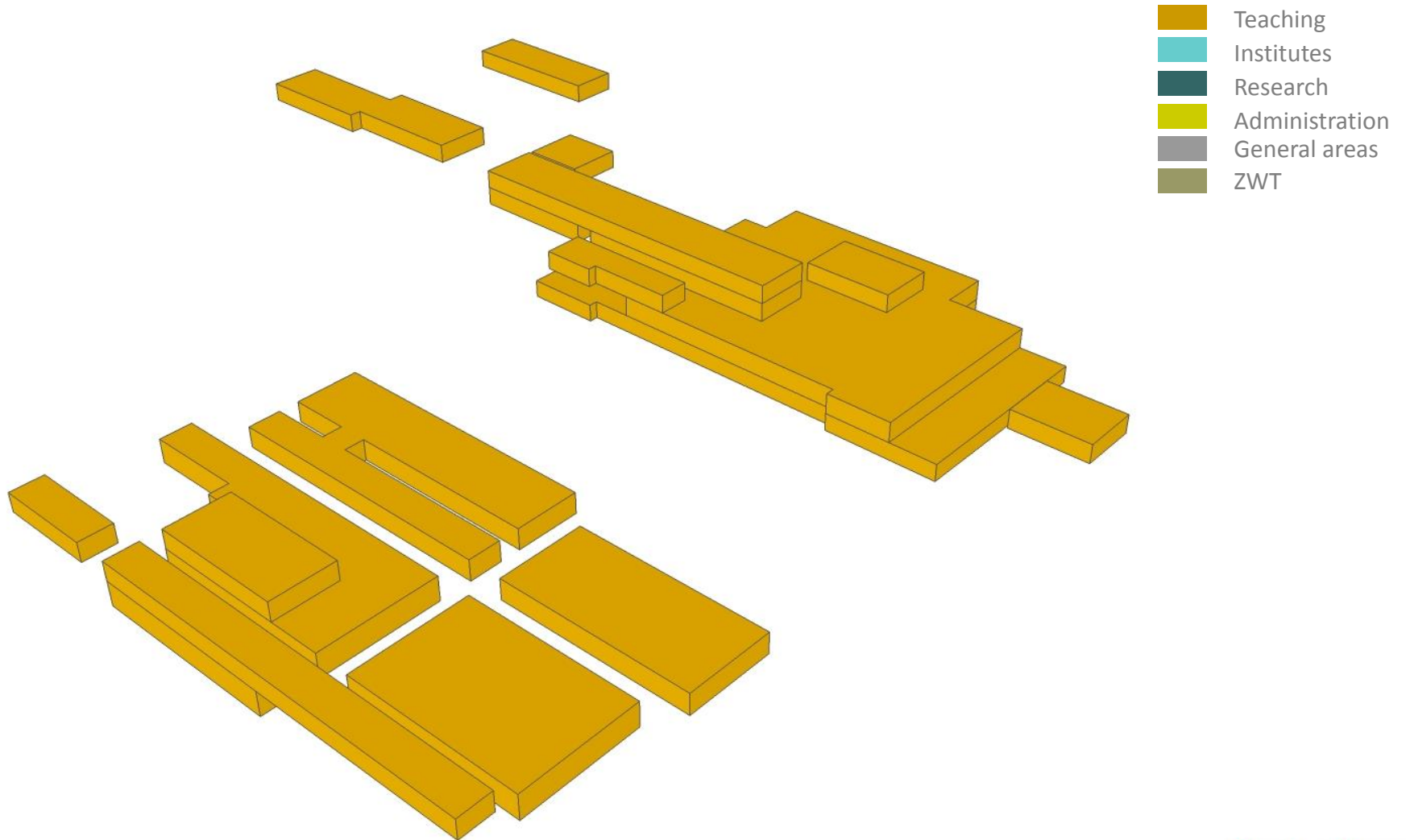
Source: AGNHB, TU Graz



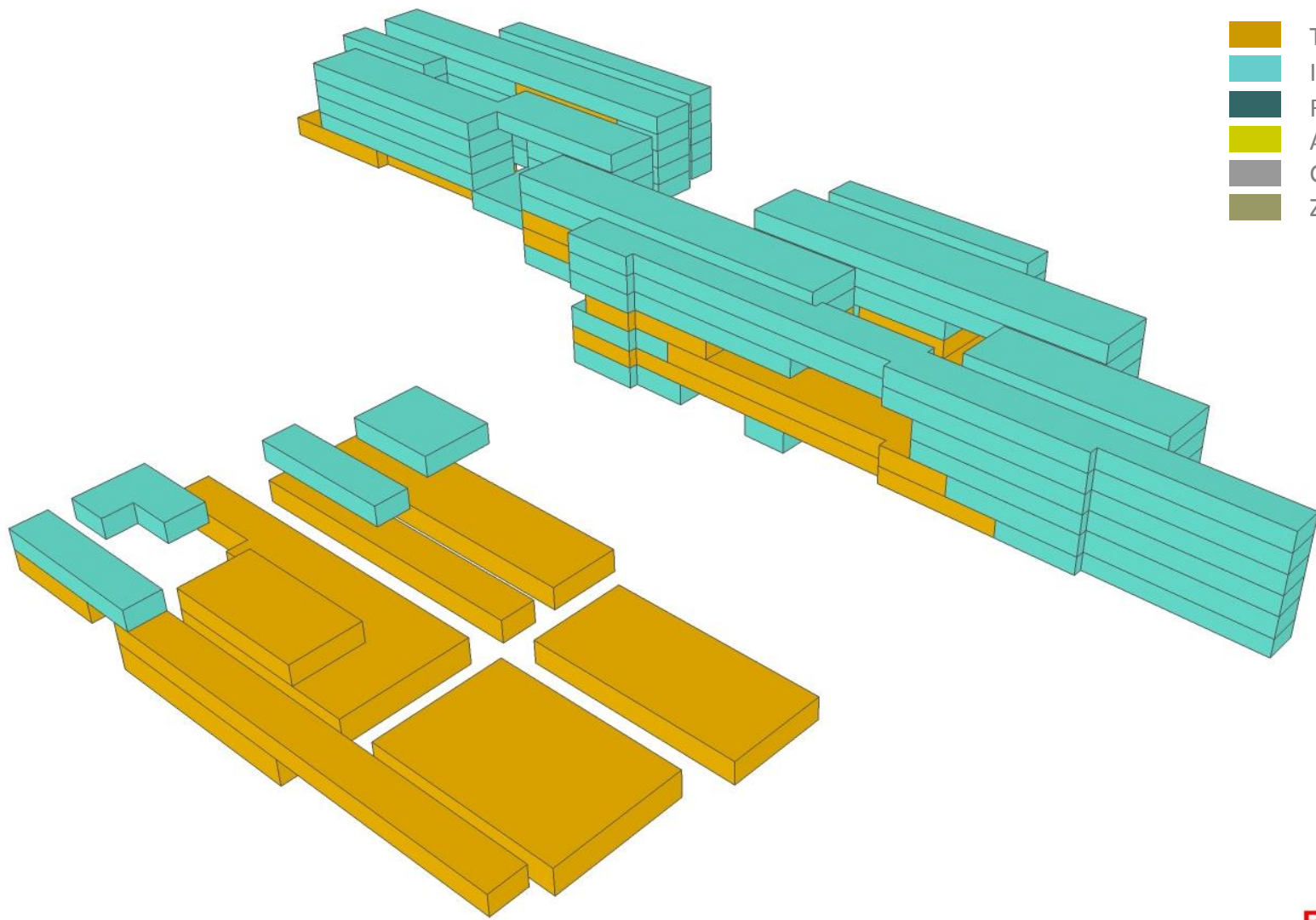
●●● MED CAMPUS

▶▶ The functions

Teaching



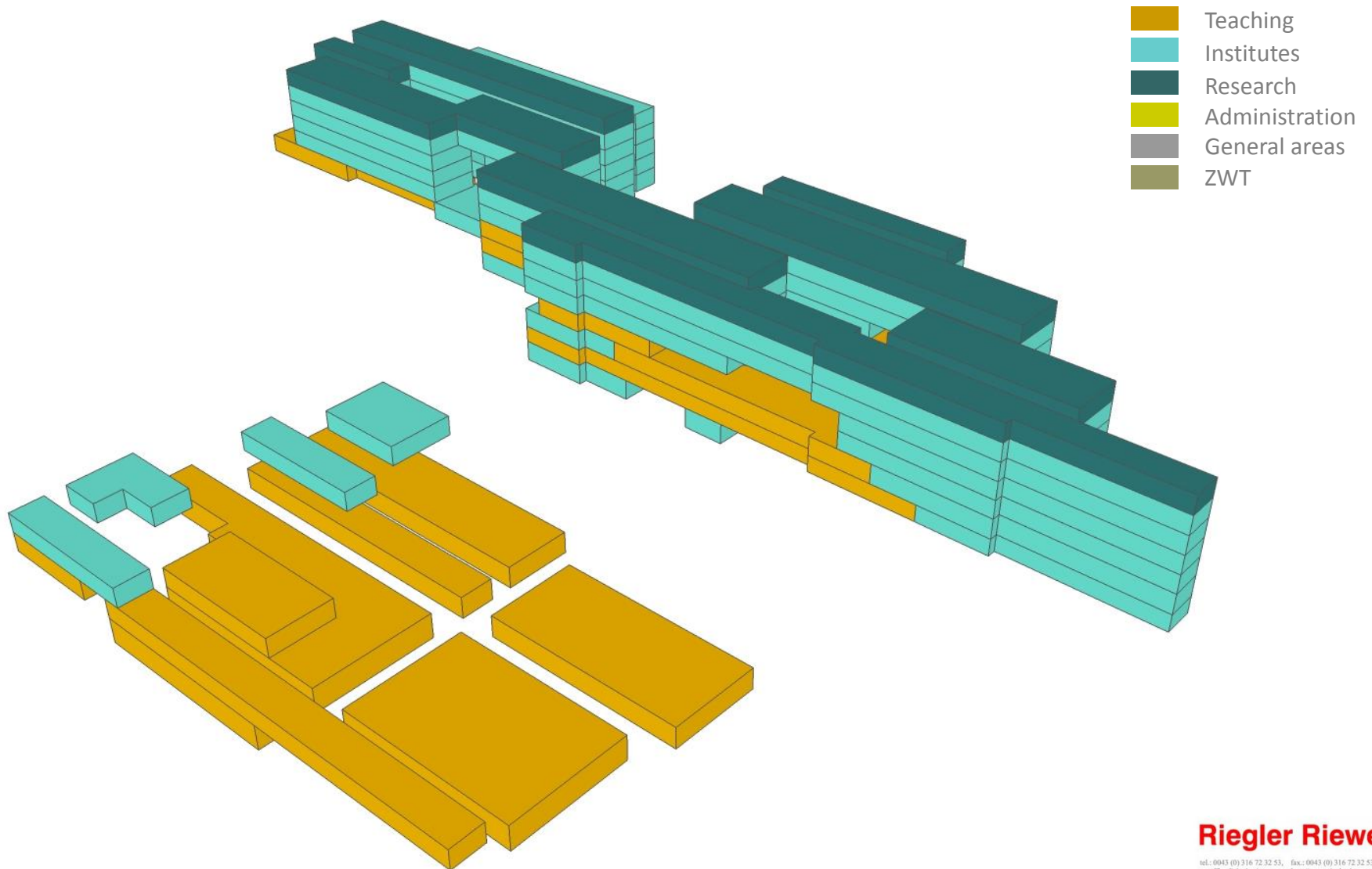
Institutes



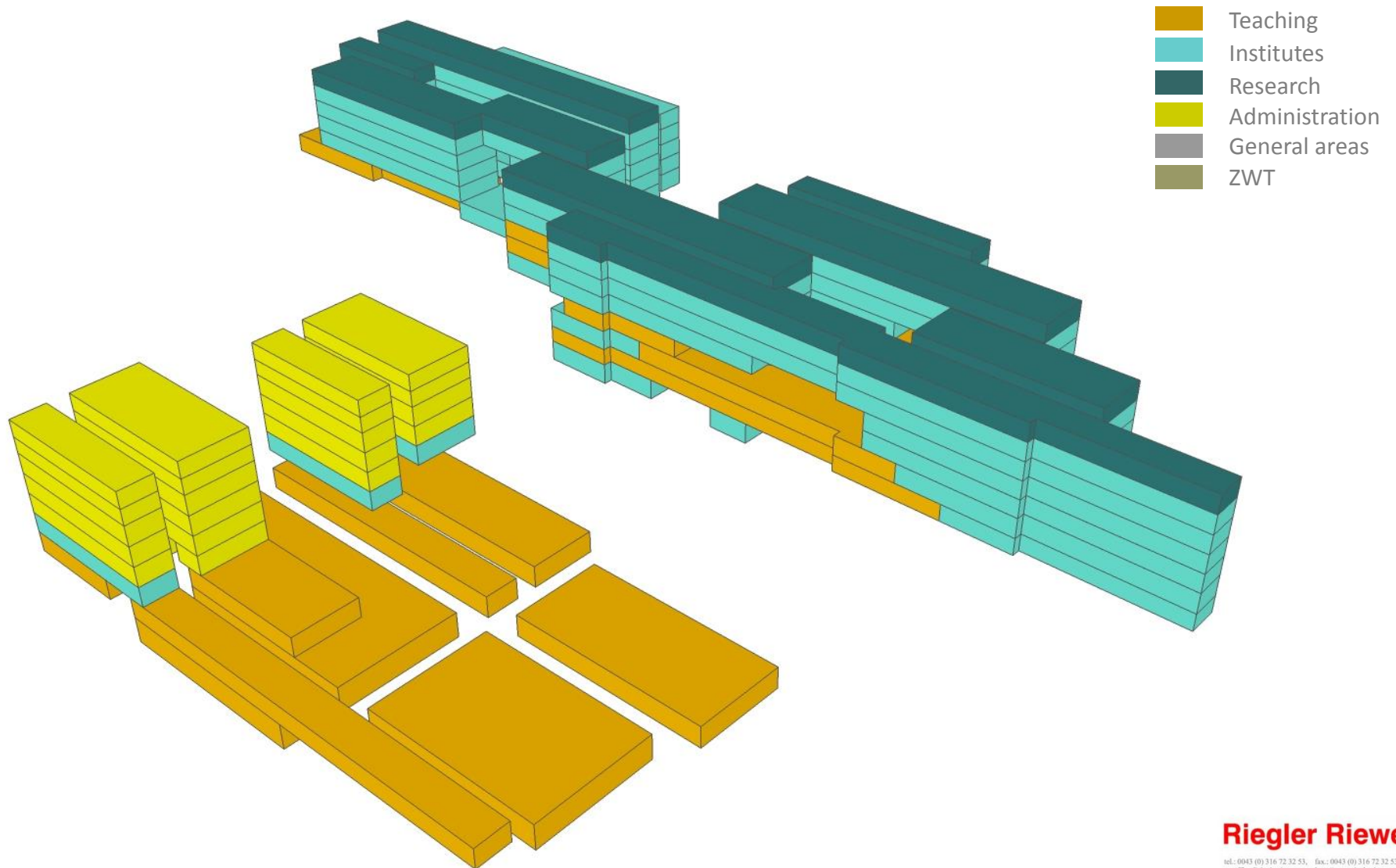
- Teaching
- Institutes
- Research
- Administration
- General areas
- ZWT

(Quelle/Visualisierung: Riegler Riewe Architekten ZT GmbH)

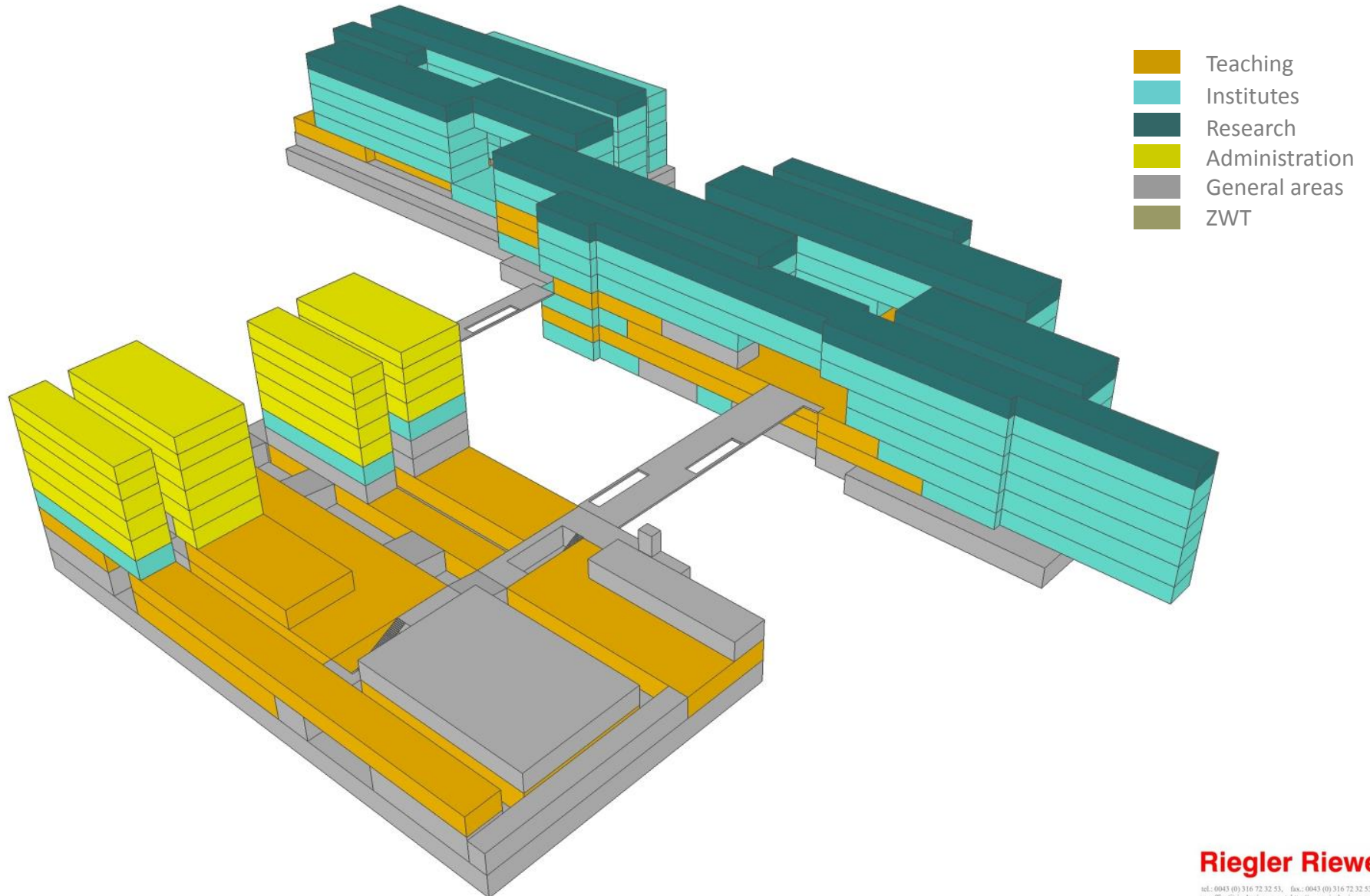
Research



Administration



General areas



MED CAMPUS

▶▶ **The integration of sustainability into the design process**

Managing sustainability




Project structure

Customer & user




Medizinische Universität Graz


Developer



BIG Bundes Immobilien Gesellschaft

General planning

Auftragnehmer
Riegler Riewe Architekten ZT GmbH



Generalplanung / Architektur
Riegler Riewe Architekten ZT GmbH

17 Personen

+

Fachplaner:
42 Personen

=

Gesamt:
59 Personen

Riegler Riewe

Tragwerksplanung Peter Mandl ZT GmbH	10 Personen
TGA ARGE TGA Med Campus Graz	10 Personen
Bauphysik Rosenfelder & Höfler consulting engineers GmbH & Co KG	3 Personen
Laborplanung Dr. Heinekamp Labor- u. Institutsplanung GmbH	5 Personen
Verkehrsplanung Snizek + Partner Verkehrsplanungs GmbH	2 Personen
Brandschutz/Planungskoordination i.S. BauKG Norbert Rabl ZT GmbH	4 Personen
Landschaftsplanung Büro Land in Sicht	3 Personen
Energy Design Energy Design Cody	2 Personen
Lichtplanung Day & Light Lichtplanung GbR	2 Personen
Lebenszykluskosten Turner & Townsend GmbH	1 Person

Quelle/Visualisierung: Riegler Riewe Architekten ZT GmbH, Rektoratspräsentation MUG



Rules for architectural competition (2009)

- Philosophy of university: development as a sustainable and healthy property in the broadest sense
- Target objective sustainability

Nähere Beschreibung der Aufgabenstellung

Generalplaner-Wettbewerb
MED CAMPUS Graz



C 6 ZIELSETZUNG NACHHALTIGKEIT (PRÄAMBEL)

Die moderne Universität ist längst keine geschlossene Bildungseinrichtung mehr, sondern ein Ort des kommunikativen Erfahrens und Lernens für junge, lern- und wissbegierige, kosmopolitisch orientierte Studierende und ForscherInnen. Die moderne Universität ist auch ein Ort, an dem wichtiges, lebens-notwendiges Wissen für die Gesellschaft erschaffen und gelehrt wird, ein offener Ort für eine offene Gesellschaft. Das Subjekt des neuen Universitätscampus, die Medizin, hat sich in den vergangenen Jahrzehnten weg von der bloßen kurativen Praxis hin zur Heilkunst und Wissenschaft im Dienste der Gesundheit entwickelt.

Vor diesem Hintergrund muss auch die Immobilie des Neuen Campus eine „nachhaltig gesunde Immobilie im weitesten Sinne“ sein, sie muss Wohlfühlen, Wohlbefinden und Engagement ausstrahlen. Sie sollte im baulichen, ökologischen und sozialen Sinne mehr an ihre Umgebung und an den Stadtraum geben, als sie von diesen nimmt. Sie muss offen zu ihrem Umfeld, zugleich aber konzentrierend für die Wissenssuchenden sein. Der Titel „Gesundheitscampus“ soll die Aspekte der positiven Energie und des Austausches in sich vereinen und stellt eine programmatische Leitlinie für den Städtebau dar.

Daher soll der Campus in Bezug auf Funktionalität, Nutzungsmehrwert, Umweltbelastung, Ressourcenverbrauch und Kosten nachhaltig sein. Nachhaltigkeit ist gemäß dem Brundtland Bericht 1987 zu verstehen – „Nachhaltige Entwicklung ist eine Entwicklung, die den Bedürfnissen der heutigen Generation entspricht, ohne die Möglichkeiten künftiger Generationen zu gefährden ihre eigenen Bedürfnisse zu befriedigen und ihren Lebensstil zu wählen.“

In der Wettbewerbsphase sind der Handlungsspielraum und der mögliche Einfluss auf die Nachhaltigkeit eines Bauvorhabens am größten. Viele der Entscheidungen, welche in dieser Phase und in den ersten Phasen der Planung getroffen werden, legen die Nachhaltigkeit eines Projektes fest. Der Auslober legt daher besonderen Wert auf die nachhaltige Qualität der Wettbewerbsprojekte.

Diese Zielsetzung soll durch ein Herantasten an die Grenzen des technisch und wirtschaftlich Machbaren erreicht werden.

Objective target catalogue sustainability (2010)

- Paralell developement of objective target catalogue sustainability as part of contract for general planning
 - Specifying key aspect
 - Defining structure for reports

MED CAMPUS
Medizinische Universität Graz

Zielsetzungskatalog Nachhaltigkeit
Graz, 16.06.2010

MED CAMPUS
Univ.-Prof. Dr. P. Maydl
IMBT - TU Graz
ecowall

ZIELSETZUNGSKATALOG

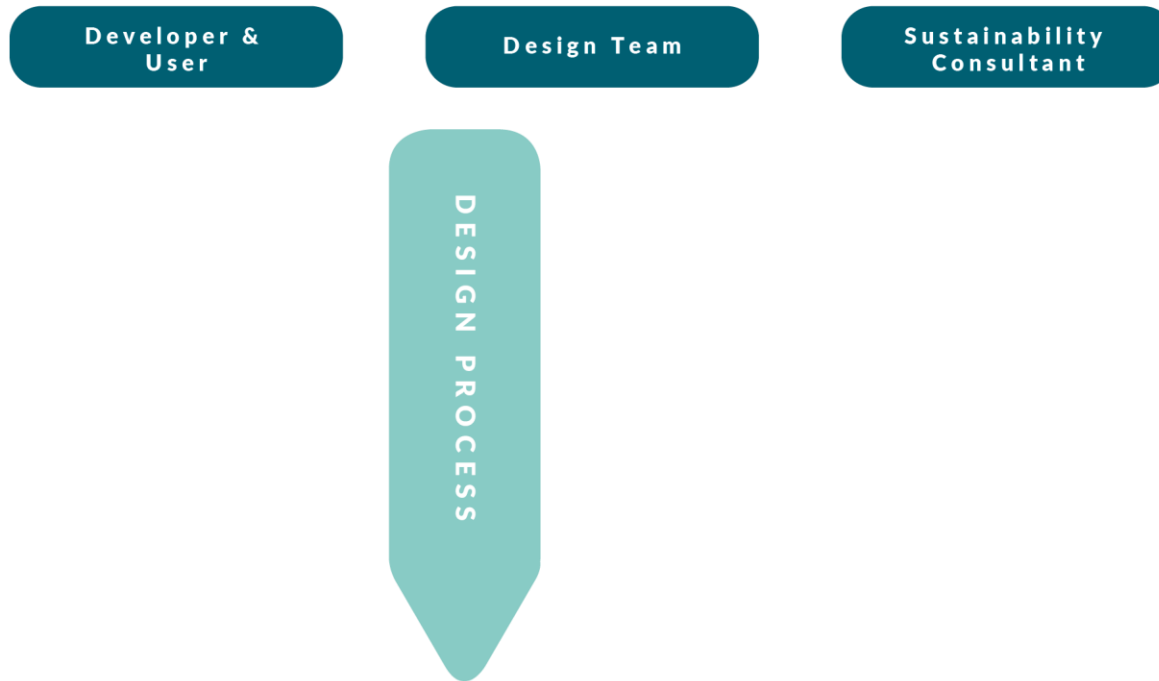
Ökologische Qualität
Wirkungen auf die globale und lokale Umwelt

Kriterium: **1** **Treibhauspotenzial (GWP)**

Unterpunkt:

Generelles Ziel:

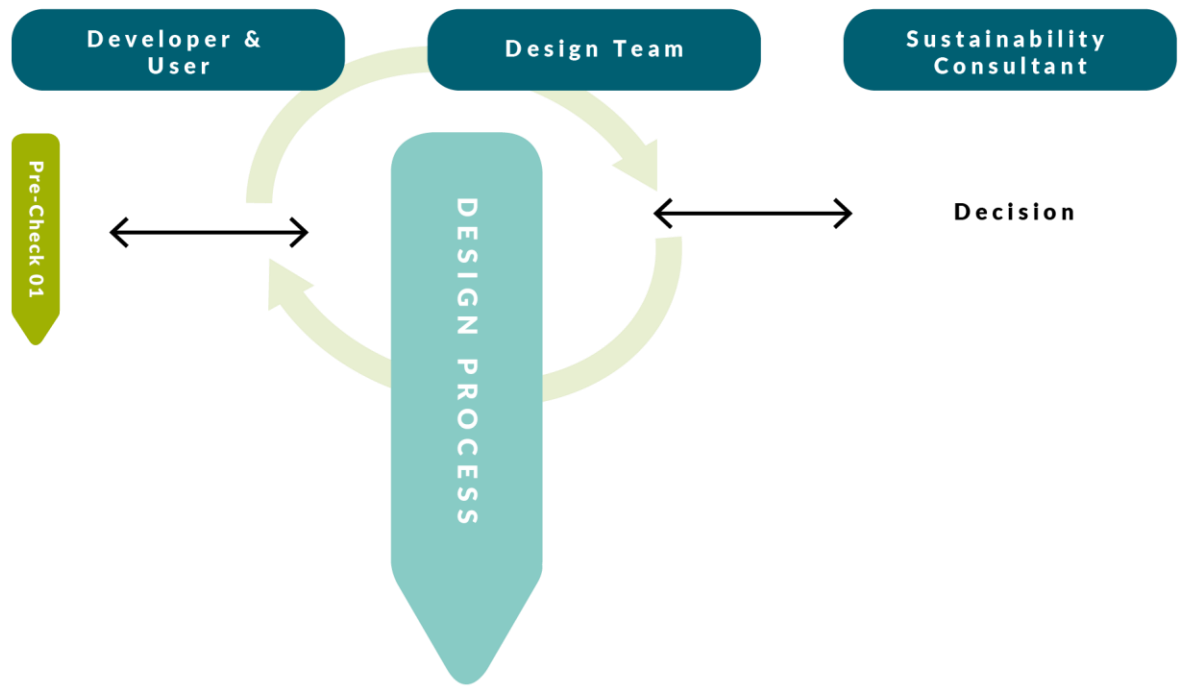
INTEGRATION OF THE STAKEHOLDER



Design process

Iterative optimization

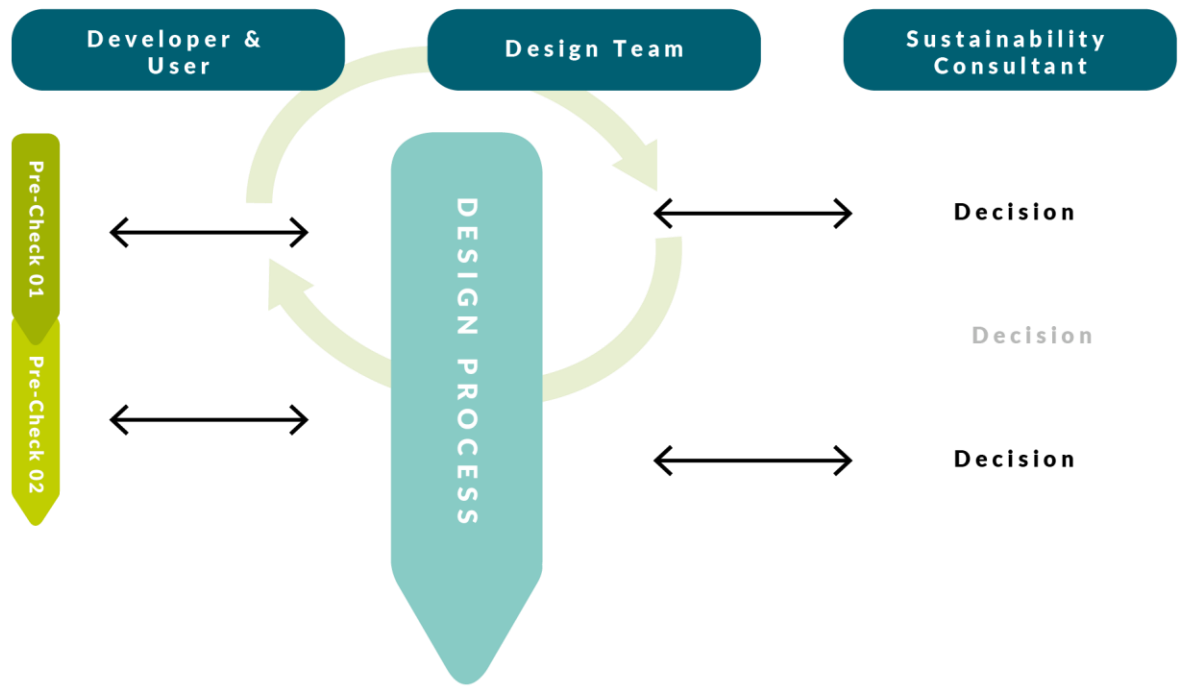
INTEGRATION OF THE STAKEHOLDER



Source: AGNHB, TU Graz



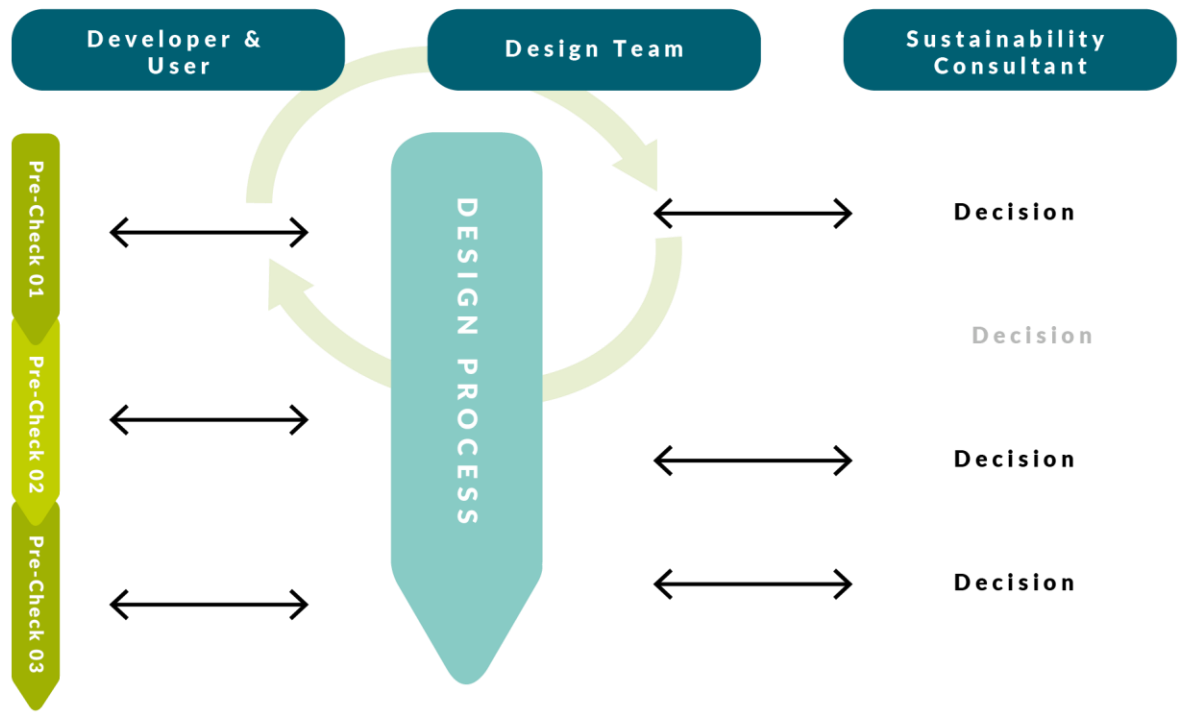
INTEGRATION OF THE STAKEHOLDER



Source: AGNHB, TU Graz



INTEGRATION OF THE STAKEHOLDER

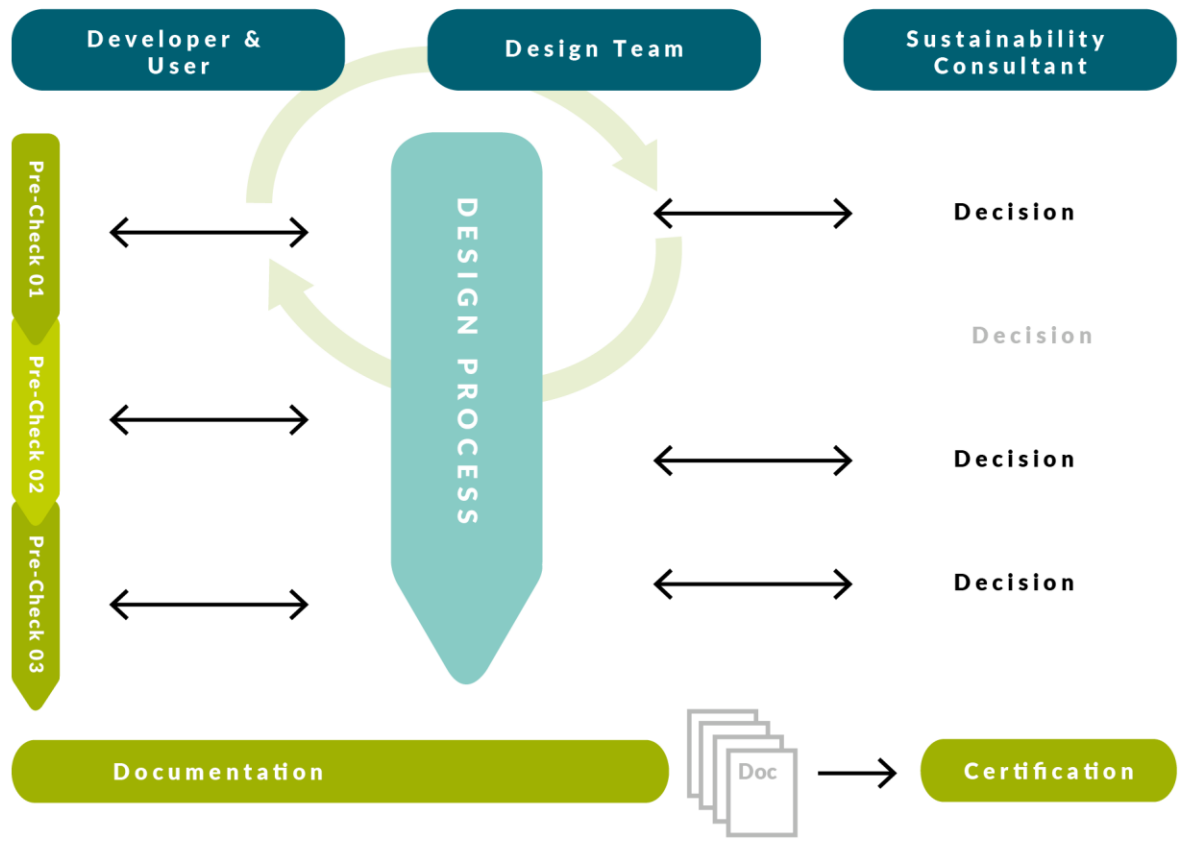


Source: AGNHB, TU Graz



Iterative optimization

INTEGRATION OF THE STAKEHOLDER



Source: AGNHB, TU Graz



MED Campus Graz

Neubau mischgenutzte Gebäude
New mixed-use Buildings

92,0%
Ökologische Qualität
Environmental Quality

84,0%
Ökonomische Qualität
Economic Quality

91,9%
Soziofunkt. Qualität
Socio-Funct. Quality

74,9%
Technische Qualität
Technical Quality

95,4%
Prozessqualität
Process Quality

86,7%
Objektbewertung
Property Valuation

84,9%
Standortbewertung
Site Quality

Vorzertifikat in
Gold
2013



Besteller: Medizinische Universität Graz

Bauherr: Bundesimmobilienges.m.b.H

Architekt: Riegler Riewe Architekten
ZT-GmbH

Auditoren: Alexander Passer
Helmuth Kreiner

Bruttogeschossfläche Modul 1: 44.485 m²



- Full criteria list helps in communication with stakeholders
- Be aware of interdependencies of criteria
- Trade-offs and synergies
- Opportunity early design phases
- Full consideration of sustainability criteria in supply chain
- Holistic tools for quality management
- Maturity assessment methodology for process
- Integrated workflow BIM & Sustainability tools (LCA, LCC, etc.)





2050
sea level

2030
sea level

Photo Credit: One prediction of where rising sea levels will end up at Cottesloe Beach, Western Australia. Copyright: go_greener_oz (Flickr)

World Sustainable Built Environment Conference 2017 Hong Kong
Transforming Our Built Environment through Innovation and Integration:
Putting Ideas into Action
5-7 June 2017

**Thank You for
Your Patient Attention**

