



From the Energy Evaluation to the Assessment of the whole Building Performance

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 Research for Sustainability - Driver for Innovation
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Assessment of Buildings - Why?

- Reduction and control of the negative impacts of the building on the surrounding environment
- Higher competitiveness during the whole life cycle
- Securing the comparability of the building performance
- Improvement of the transparency of the planning process:
 - by reporting of the building performance
 - through provision of informations for the operator and user
- Guarantee of the realization of sustainable buildings:
 - by monitoring
 - by advancing of integral planning processes



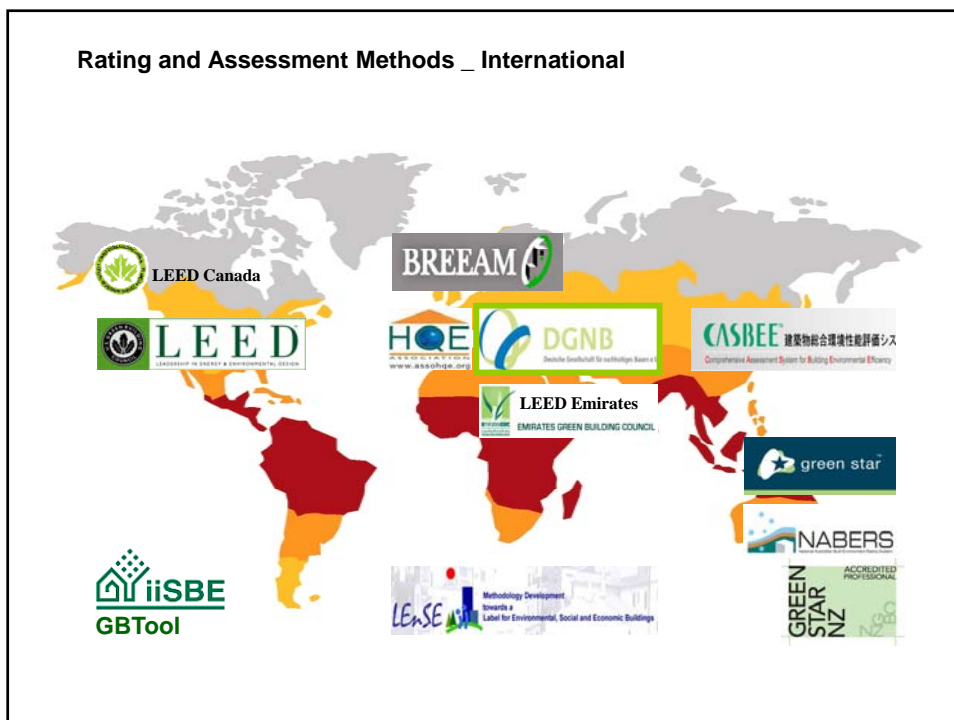
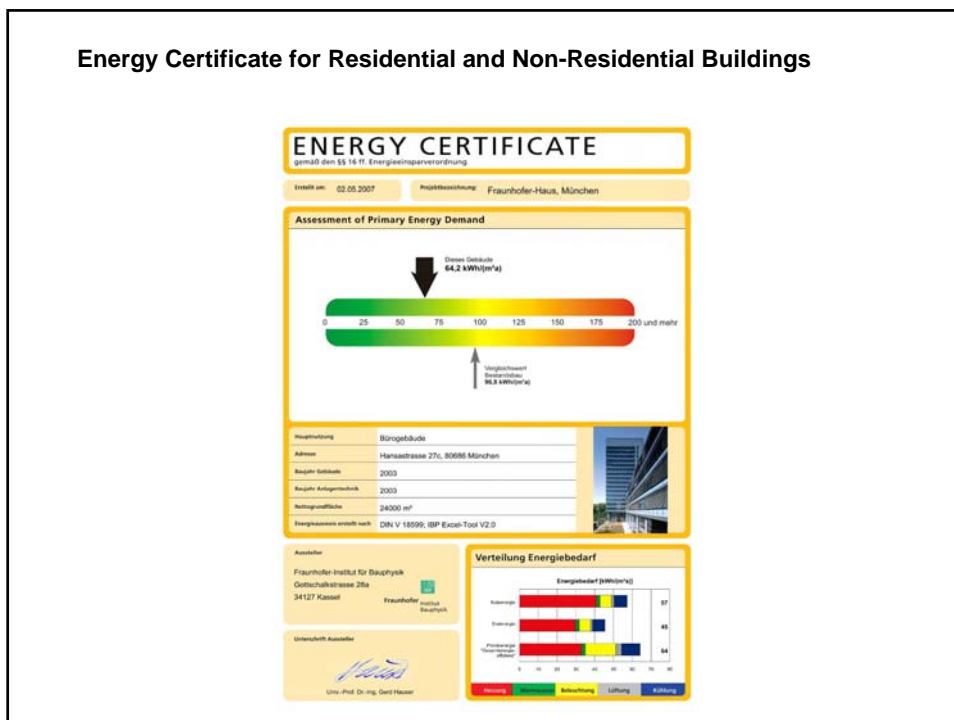
User of Assessment Methods

- Architects
- Civil engineers
- Environmental engineers
- Developers
- Owners
- Politicians
- Building industries
- Financial institutions
- Facility management providers
- Research institutions
- etc.



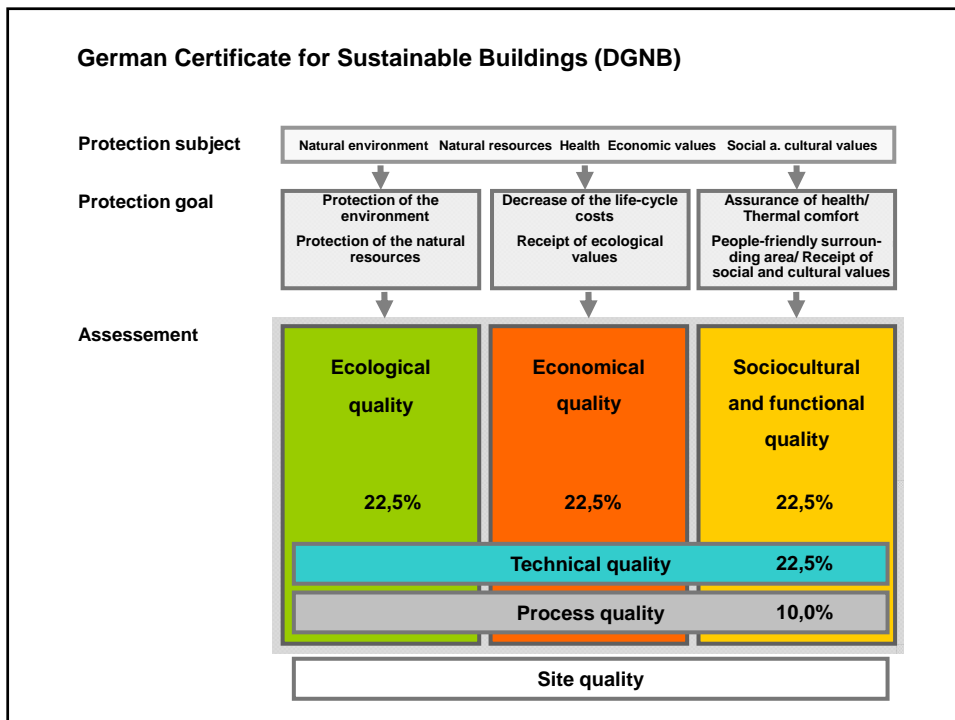
Instruments and Tools for the Assessment of Buildings

- **Product declarations:** Building materials and supplies
- **Element catalogues:** Building components
- **Tender documents:** Ecological orientated specifications/ descriptions
- **Energy Certificate:** Description and rating of the energy performance of buildings
- **Check lists**
- **Guidelines:** Formulation of objectives, rules and concepts
- **Integral planning aids and rating tools:** Interactive tools for decision making
- **Building labels, evaluations and certificates:** Rating of the building performance



German Certificate for Sustainable Buildings (DGNB)

- Developed by the Federal Ministry of Transport, Building and Urban Affairs (BMVBS) and the German Sustainable Building Council (DGNB)
- **2007:** Foundation of the German Sustainable Building Council (DGNB), member of the World Green Building Council
 - Non-profit organisation
 - More than 300 members
- **Mission of the DGNB:** Advancement of sustainable buildings in Germany and development of the German Certificate for Sustainable Buildings
- **Time line:**
 - Case studies: Office buildings (Oct-Dec 08)
 - Training of auditors (Oct 2008)
 - Start of the certification process (Jan 09)
 - Development of version for other building types (Jan 09)
- **Contact:** www.dgnb.de

Ecological Quality

Ecological quality	Effect on the local and global environment	1.	Global warming potential (GWP)
		2.	Ozone depletion potential (ODP)
		3.	Photochemical Ozone Creation Potential (POCP)
		4.	Acidification potential (AP)
		5.	Eutrophication potential (EUT)
		6.	Risks for the local environment
		7.	Other effects on the local environment
		8.	Other effects on the global environment
		9.	Microclimate – Heat island effect
	Resource utilization and waste accumulation	10.	Primary energy demand, non-renewables
		11.	Primary energy demand, renewables
		12.	Other use of non-renewable resources
		13.	Waste
		14.	Drinking-water consumption
		15.	Land consumption

Economical Quality

Economic quality	Life-cycle costs	16.	Life-cycle costs (building-specific)
	Value performance	17.	Value stability

Socio-cultural and Functional Quality

Socio-cultural and functional quality	Health, thermal comfort and user satisfaction	18.	Thermal comfort in winter
		19.	Thermal comfort in summer
		20.	Indoor air quality
		21.	Acoustic comfort
		22.	Visual comfort
		23.	Exertion of influence (user)
		24.	Landscaping quality (building)
		25.	Safety and failure risks
	Functionality	26.	Barrier-free accessibility
		27.	Area efficiency
		28.	Conversion capability
		29.	Public accessibility
Design quality	30.	Bicycle comfort	
	31.	Ensurance of design and urban quality through competition	
	32.	Art in buildings	

Technical Quality

Technical quality	Technical quality	33.	Fire protection
		34.	Noise protection
		35.	Performance of the thermal and moisture protection of the building envelope
		36.	Back-up ability of technical facility equipment
		37.	Operability of technical facility equipment
		38.	Performance of technical facility equipment
		39.	Durability
		40.	Maintenance and repair friendliness of the construction
		41.	Resistance against hail, storm, high water
		42.	Deconstruction and recycling friendliness

Process Quality

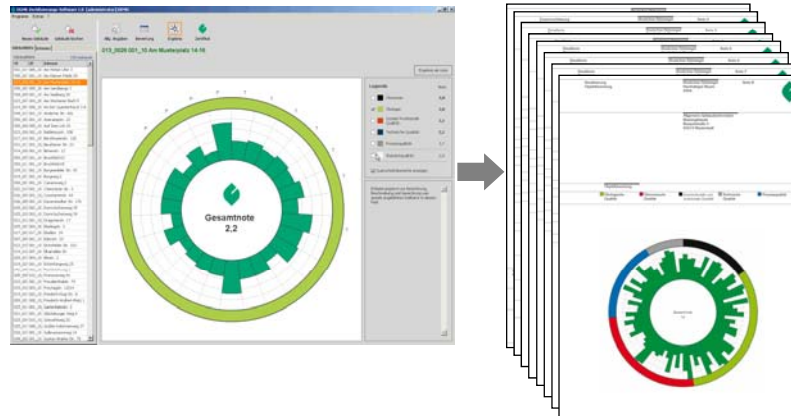
Process quality	Construction quality	43.	Quality of the preliminary planning
		44.	Integrated planning
		45.	Proof of optimization and complexity of the approach in planning
		46.	Assurance of sustainability aspects in tender and placing
		47.	Creation of premises for optimal utilization and management
		48.	Construction site/ Construction progress
		49.	Quality of executive companies/ Pre-qualification
		50.	Quality assurance of building construction
		51.	Putting into service/ Briefing of the users
		Operating quality	52.
	53.		Management
	54.		Systematic inspection, maintenance and repair
	55.		Qualification of the operating personnel

Site Quality

Site quality	56.	Risks at the micro-location
	57.	Loads/ Pollution at the micro-location
	58.	Image and condition of location and accomodation
	59.	Traffic connection
	60.	Nearness to usage-related objects and facilities
	61.	Adjacent media/ site development
	62.	Planning law situation
	63.	Expansion possibilities/ reserve assets

Assessment and Evaluation

- Detailed assessment of the criteria and aspects
- **Computer based evaluation**



Comparison: Assessment Systems of the 1. and 2. Generation

	BREEAM	LEED	DGNB
Ecological aspects	<ul style="list-style-type: none"> • Health and well-being • Energy • Transport • Water • Materials • Land use & ecology • Pollution 	<ul style="list-style-type: none"> • Water efficiency • Energy and atmosphere • Materials and resources • Indoor environmental quality 	<ul style="list-style-type: none"> • Efforts on the global and local environment • Resource utilization and waste accumulation

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Socio-cultural and functional aspects		<ul style="list-style-type: none"> • Innovation and design process 	<ul style="list-style-type: none"> • Health, thermal comfort and user satisfaction • Functionality • Design quality

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Socio-cultural and functional aspects		<ul style="list-style-type: none"> • Innovation and design process 	<ul style="list-style-type: none"> • Health, thermal comfort and user satisfaction • Functionality • Design quality
Other aspects	<ul style="list-style-type: none"> • Management 		<ul style="list-style-type: none"> • Technical quality • Planning quality • Construction quality • Operating quality
		<ul style="list-style-type: none"> • Sustainable sites 	<ul style="list-style-type: none"> • Site quality

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➔ **Different basic conditions:** climate, policy and culture
Different calculation rules/ legislation: LEED (ASHRAE), DGNB (EnEV)

The German Certificate: A Framework for International Use

		obligatory		weighting factor	impact of the criteria on the whole system	weighting of the aspects
Ecological quality	Effect on the local and global environment	1.	X	Global warming potential (GWP)	3	2,93%
		2.	X	Ozone depletion potential (ODP)	1	0,98%
		3.	X	Photochemical Ozone Creation Potential (POCP)	1	0,98%
		4.	X	Acidification potential (AP)	1	0,98%
		5.	X	Eutrophication potential (EUT)	1	0,98%
		6.	X	Risks for the local environment	3	2,93%
		7.		Other effects on the local environment		
		8.	X	Other effects on the global environment	1	0,98%
		9.		Microclimate – Heat island effect	2	1,96%
	Resource utilization and waste accumulation	10.	X	Primary energy demand, non-renewables	3	2,93%
		11.	X	Primary energy demand, renewables	2	1,96%
		12.		Other use of non-renewable resources		
		13.	X	Waste	1	0,98%
		14.	X	Drinking-water consumption	2	1,96%
		15.	X	Land consumption	2	1,96%
						22,5%