Evaluation ENERBUILD-Tool – existing buildings

Kindergarden Brunneck

1 Basic information about the building

Name of the building	Kindergarden Brunneck
Address of the building	Hans Theodor Niederbacher Straße 4; 39031 Bruneck/Reischach (Bz) Italy
Owner/investor	Municipality of Brunneck
Year of construction	2008-2010
Planner	Arch. Georg Niederwieser, Ing. Peter Auer
Building type	Wood construction with prefabricated wooden frames.
Building method	Wooden frame with mineral wool insulation and external cork insulation.
Number of buildings	1
Number of levels above earth	2
Number of levels underground	1
Kind of the public use	Kindergarden
Effective area for public use in m ² (net)	983 m²
Additional private uses	/
Effective area for private use in m ² (net)	/
Total effective area in m ²	983 m²
Source of energy for heating	Biomass and gas delivered by district heating
Heating system	District heating
Water heating system	District heating
Date of the building evaluation	2010

2 Execution of the building evaluation with the ENERBBUILD tool

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3 Results

Nr.		Title	Must criteria (M)	max. points	evaluated points
A		Quality of location and facilities		max. 100	56
A	1	Access to public transport network		50	6
A	2	Ecological quality of site		50	50
B		Process and planning quality		max. 200	130
B	1	Decision making and determination of goals		25	15
B	2	Formulation of verifiable objectives for energetic and ecological measures	M	25	20
B	3	Standardized calculation of the economic efficiency	M	40	0
B	4	Product-management - Use of low-emission products		60	30
B	5	Planning support for energetic optimization		60	55
B	6	Information for users		25	10
C		Energy & Utilities (Passive house)		max. 350	329
C	1	Specific heating demand (PHPP)	M	100	54
C	2	Specific cooling demand (PHPP)	M	100	100
C	3	Primary energy demand (PHPP)	M	125	125
C	4	CO2-emissions (PHPP)		50	50
D		Health and Comfort		max. 250	111
D	1	Thermal comfort in summer		150	65
D	2	Ventilation - non energetic aspects		50	25
D	3	Daylight optimized (+ lightening optimized)		50	21
E		Building materials and construction		max. 200	129
E	1	$OI3_{TGH-lc}$ ecological index of the thermal building envelope (respectively OI3 of the total mass of the building)		200	129
Sum				max. 1000	755

4 Conclusions from the building evaluation with the ENERBUILD-Tool

a) Generally

The evaluation seems feasible and practicable in an appropriate working time. The most problematic part was to gather all necessary documents and information.

b) About the planning process

Part B, the Process and planning quality was evaluated within an interview with the architect. Written documentations about the single criteria were in part missing.

c) About the building itself

The building was evaluated with 755 points and is placed in the middle field of the ENERBUILD certification.

d) About the evaluation process

Problems during the evaluation problems were met in following:

Criterion B3: The criterion of economic efficiency is a must criterion, but in practice not always economic efficiency is followed for smaller public buildings, like in this example.

Criterion D2: The calculation from Uni EN 12354-5 was not done, but the planners respected principal planning strategies to avoid sound transmissions.

5 Suggestions for improvement of the ENERBUILD-Tool

Some criteria of the catalog could be formulated more precise.
For example criteria B1: Division of the competitions into public competitions for architectural ideas and preliminary design, preliminary competition, executive competition, public tendering.

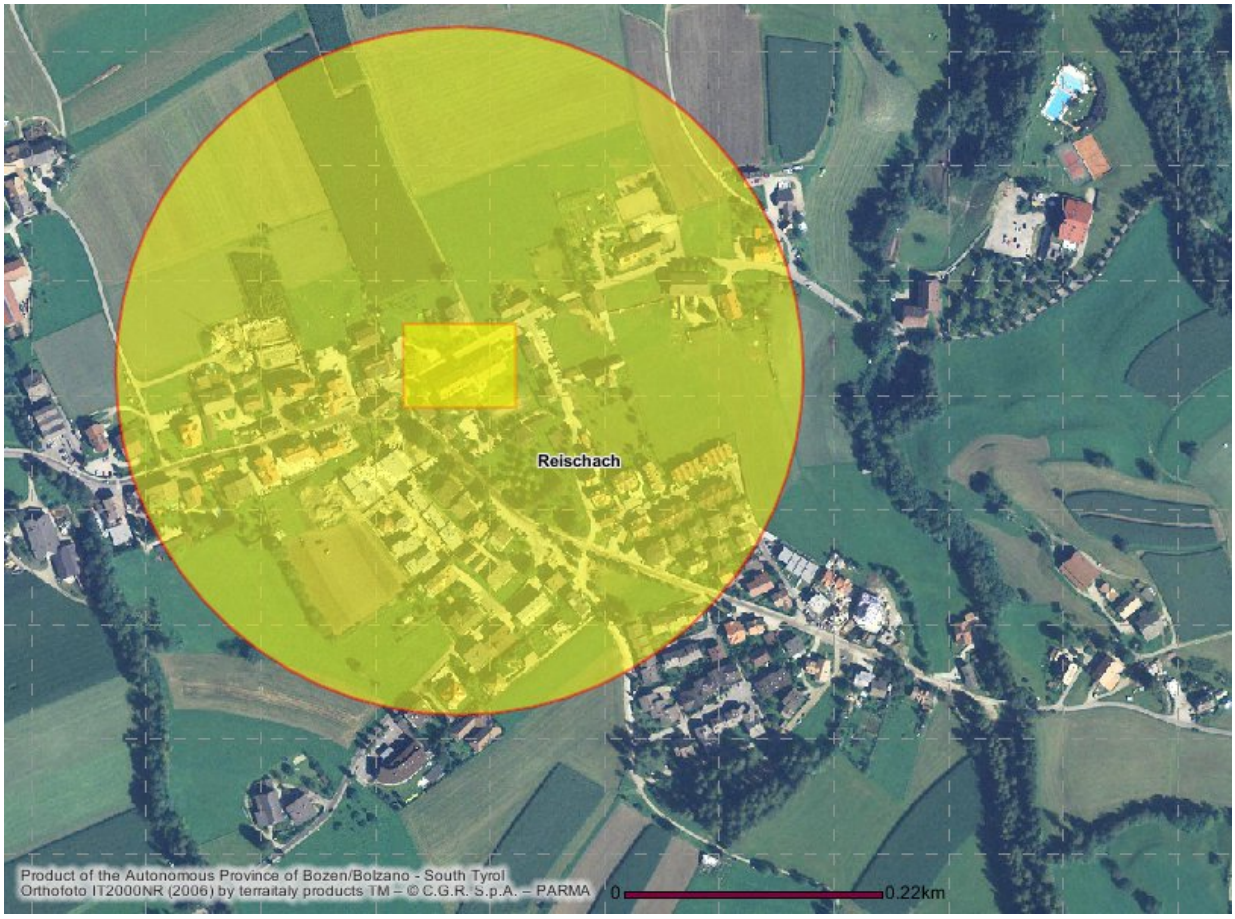
B3: The tool of Frankfurt for calculated the economic efficiency could be added in the appendix.

5. Annex A: Detailed evaluation of criteria

A Quality of location and facilities

A2 Access to public transport network

The public transport was evaluated within the surrounding bus stations in a diameter of 300 meters. There is one bus-station with an hourly frequency serving the rest home.



	Punkte
Access to public transport network	max. 50
Points for each bus-station in a radius of 300 m with hourly frequency or shorter frequency	6
Points for each bus-station in a radius of 300 m with half-hourly frequency or shorter frequency	10
Points for each train-station in a radius of 500 m with hourly frequency or shorter frequency	5
Points for each train-station in a radius of 500 m with half-hourly frequency or shorter frequency	8

EB-points:	Max. points:	Obtained points
	50	**6**

A2 Ecological quality of site

The old schoolyard was taken as building site for the new Kindergarden.

- Therefore criteria a1 – area with zero ecological value:

Performance score	Calculated Ecological value of land
-1 – negative	>5
0 – standard	5
3 – good	2.6
5 - excellent	1

Performance score 5

EB-points:	Max. points:	Obtained points
	50	**50**

B Process and planning quality

B1 Decision making and determination of goals

The municipality gave a direct assignment to the architect for the planning of a new Kindergarden. The old one was too small for the increasing number of children. One Variant with a nursery school part was elaborated.

Criteria	Max points	Obtained points
Exists a documentation of the decision making process	10	5
Did variants be considered and evaluated?	5	5
Evaluation of the 0-variant	5	5
Exists a documentation of the evaluation scheme of the variants	4	-
Does it contain: Urbanism Access to public transport Use of area and floor Energy efficiency Ecological use of materials	 2 2 2 2 2	-

EB-points:	Max. points	Obtained points
	25	**15**

B2 Formulation of verifiable objectives for energetic and ecological measures

Definition of minimum criteria by fixing some limit values:

- The municipality fixed at the beginning of the planning process a limit for the energy consumption for heating. They defined the CasaClima A limit with 30 kWh/m²a as minimum standard for the new Kindergarden. As well they wanted to have an ecological construction materials.
- The air tightness was fixed within the passive house label and the CasaClima certification: n50,lim < 0,6 h(-1)
- Efficiency of the ventilation system: the tenant and planner choose a product which was certified by the passive-house institute with a high efficiency.
- The use of sustainable products was taken into account.

EB-points:	Max. points:	Obtained points
	25	**20**

B3 Standardized calculation of the economic efficiency

The live cycle costs and the economic efficiency were not calculated in the planning phase.

EB-points:	Max. points:	Obtained points
	40	**0**

B4 Product-management-Use of low-emission products

The planner and the municipality decided from beginning on, to use low emitting construction products (wood construction, insulation material, floorings, windows). Most of the materials were put into the tender and controlled on the construction site.

Criteria	Max points	Obtained points
Exists a documentation of the ecological optimization of the materials during the planning phases	10	0
The tender for all craftworks have been declared ecologically? Criteria like in baubook. 100% of works 90% of works 70% of works	20	10
Were all products of all craftworks declared? 100% 90% 70%	30 20 10	10
Does un ecological building supervision exist? Did the supervisor do regularly inspections on the building site? - Total construction process - Partially construction process	20 10	10

EB-points:	Max. points:	Obtained points
	60	**30**

B5 Planning support for energetic optimization

The energetically aspects during the planning and construction phase were considered and optimized.

Criteria	Max points	Obtained points
Compilation of a space allocation plan	5	5
Roomly distribution of air-flows as calculated in PHPP	5	5
Establishment of internal heat gains	5	5
Consideration of thermal bridges with 0,003 W(m²K)	5	5
Description of energetically requirements (Uw,Ug, g-value, effectiveness heat recovery) in tendering	5	5
Control of energetically aspects in offers	5	5
Support of site manager in energetically aspects with meetings on building site	5	5
Protocol of the initial measurement of the ventilation system	5	5
Protocol of the blower door test	5	5
Protocol of hydraulically adjustment of heating system	5	5
Compilation of energy requirements calculation after the construction phase, blower door test	5	5
Independent evaluation of the energy requirement calculation	5	0

EB-points:	Max. points:	Obtained points
	60	**55**

B6 Information for users

An oral explanation was held to the kindergarten teachers in order to explain them the use the HVQC system and the operating mode of a high efficient building.

EB-points:	Max. points:	Obtained points
	25	**10**

C Energy & Utilities (Passive house)

C1 Specific heating demand (PHPP)

Specific space heat demand: 21 kWh/m²a

EB-points:	Max. points:	Obtained points
	100	**54**

C2 Specific cooling demand (PHPP)

Specific cooling demand: 0 kWh/m²a

EB-points:	Max. points:	Obtained points
	100	**100**

C3 Primary energy demand (PHPP)

Specific primary energy demand: 44 kWh/m²a

EB-points:	Max. points:	Obtained points
	125	**125**

C4 CO2-emissions (PHPP)

CO2-emissions: 7,8 kg/m²a

EB-points:	Max. points:	Obtained points
	50	**50**

D Health and Comfort

D1 Thermal comfort in summer

Criterion	Points (max 150)
Building with less than 35 % Windows surfaces and without active cooling system	50
Analysis based on ON B8110-3	50
Or analysis OIB RL-6; KB* < 0,4 kWh/m³a	35
Or analysis OIB RL-6; KB* < 0,6 kWh/m³a	65
Or Analysis PHPP, Überschreitung 26 °C < 5 %	
Dynamical building simulation (at least for critical rooms) considerating the local climate, flexible shading systems and the respected usage of the buliding.	
exceeding 26 °C < 5 % without activ coling system (e.b.free night cooling)	150
exceeding 26 °C < 10 % without activ coling system (e.b.free night cooling)	50
exceeding 26 °C < 3 % with active cooling system	75
Analysis to prevent air currents (v < 0,1 m/s, ΔT < 2 K at the domicile)	75

Relation of opaque and transparent surfaces: 1764m² of opaque surfaces and 527m² of transparent surfaces. 29,8% of the surfaces are transparent, therefore the overheating analysis was made with the non dynamic calculation software PHPP.

The result of the overheating frequency is 0,0 %

EB-points:	Max. points:	Obtained points
	150	**65**

D2 Ventilation – non energetic aspects

Criterion	Points (max 50)
Sound transmission calculation (depending on the room use), prognostic of expected sound presser level $L_{A,nT}$ < 30 dB and $L_{C(50\text{-}4000),nT}$ < 50 dB	25
Sound emission calculation on most exposed working place $L_{A,nT}$ < 30 dB and $L_{C(50\text{-}4000),nT}$ < 50 dB	40
Sound emission calculation on most exposed working place $L_{A,nT}$ < 30 dB und $L_{C(50\text{-}4000),nT}$ < 50 dB	50

EB-points:	Max. points:	Obtained points
	50	**25**

Product sheet of mechanical Ventilation Heat Recovery Unit campus 500 DC

minimum ventilation (300 m³/h) 35,6 dB(A)

normal ventilation (500 m³/h) 37,7 dB(A)

maximum ventilation (600 m³/h) 39,7 dB(A)

The passive house certificate declares for this unit the usage of acoustical absorbers in room with air inlets and outlets. The installation of the ventilation machine has to be in a separated sound decoupled room. All this requirements were respected and therefore awarded 25 points.

D3 Daylight optimized (+ lightening optimized)

The daylight factor was calculated with following formula from UNI EN 15193, 2008 for each room:

Rooms	Daylight factor [%]
Exemplary class room 1th floor	2,77
Exemplary class room 2nd floor	3,70

Result:

Mean daylight factor:	3,23

EB-points:	Max. points:	Obtained points
	50	**21**

E Building materials and construction

E1 $OI3_{TGH-lc}$ ecological index of the thermal building envelope (respectively OI3 of the total mass of the building)

$OI3_{TGH,BGF}$= 129 points

$$pts = 2 * (0{,}0007 * OI3_{TGH-BGF_h}{}^{2} - 0{,}623 * OI3_{TGH-BGF_h} + 123)$$

EB-points:	Max. points:	Obtained points
	200	**109**