Evaluation ENERBUILD-Tool – existing buildings

04 Kindergarten Kramsach

1 Basic information about the building

Name of the building	Kindergarten Kramsach
Address of the building	Oberreitweg 26, 6511 Zams
Owner/investor	Gemeinde Kramsach
Year of construction	2007 - 2008
Building type	massive construction, timber frame construction
Building method	
Number of buildings	1
Number of levels above earth	2
Number of levels underground	0
Kind of the public use	Kindergarten
Effective area for public use in m ² (net)	1.106 m²
Additional private uses	-
Effective area for private use in m ² (net)	-
Total effective area in m ²	1.106 m²
Source of energy for heating	Natural gas
Heating system	Natural gas heating (existing system)
Water heating system	Natural gas heating
Date of the building evaluation	2011

2 Execution of the building evaluation with the ENERBBUILD tool

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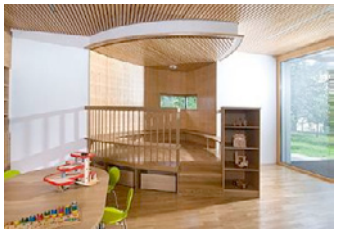
Temperature for thermal comfort in summertime: 26 °C

Local limits for heating demand: 44,65 kWh/m²
(limit OIB RL 6, HWB* new building)

3 Results

Nr.		Title	Must criteria (M)	max. points	evaluated points
A		Quality of location and facilities		max. 100	62
A	1	Access to public transport network		50	12
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	25
B	2	Formulation of verifiable objectives for energetic and ecological measures	M	20	10
B	3	Standardized calculation of the economic efficiency	M	40	0
B	4	Product-management - Use of low-emission products		60	25
B	5	Planning support for energetic optimization		60	55
B	6	Information for users		25	15
C		Energy & Utilities (Passive house)		max. 350	350
C	1	Specific heating demand (PHPP)	M	100	100
C	2	Specific cooling demand (PHPP)	M	100	100
C	3	Primary energy demand (PHPP)	M	125	125
C	4	CO2-emissions (PHPP)		50	37
D		Health and Comfort		max. 250	120
D	1	Thermal comfort in summer		150	65
D	2	Ventilation - non energetic aspects		50	25
D	3	Daylight optimized (+ lightening optimized)		50	30
E		Building materials and construction		max. 200	42
E	1	$OI3_{TGH-lc}$ ecological index of the thermal building envelope (respectively OI3 of the total mass of the building)		200	42
Sum				max. 1000	704



4 Conclusions from the building evaluation with the ENERBUILD-Tool

a) Generally

The evaluation is quite practicable in an adequate working time. Getting all the necessary information and documents is the most difficult part of it. Even if the documents are complete, it is necessary to do interviews with the planner or the owner of the building.

b) About the planning process

To evaluate the planning process it is helpful to do interviews, because written documents don't exist or it is not possible to get them.

c) About the building itself

Doing the evaluation for an existing building is only the second best way. Nevertheless the result of 704 points seems to be realistic for this building.

At the moment the passive house certification is in progress.

d) About the evaluation process

Some criteria is quite hard to evaluate. Maybe it would be possible to give some tools with the ENERBUILD-Tool to make the evaluation process easier.

5 Suggestions for improvement of the ENERBUILD-Tool

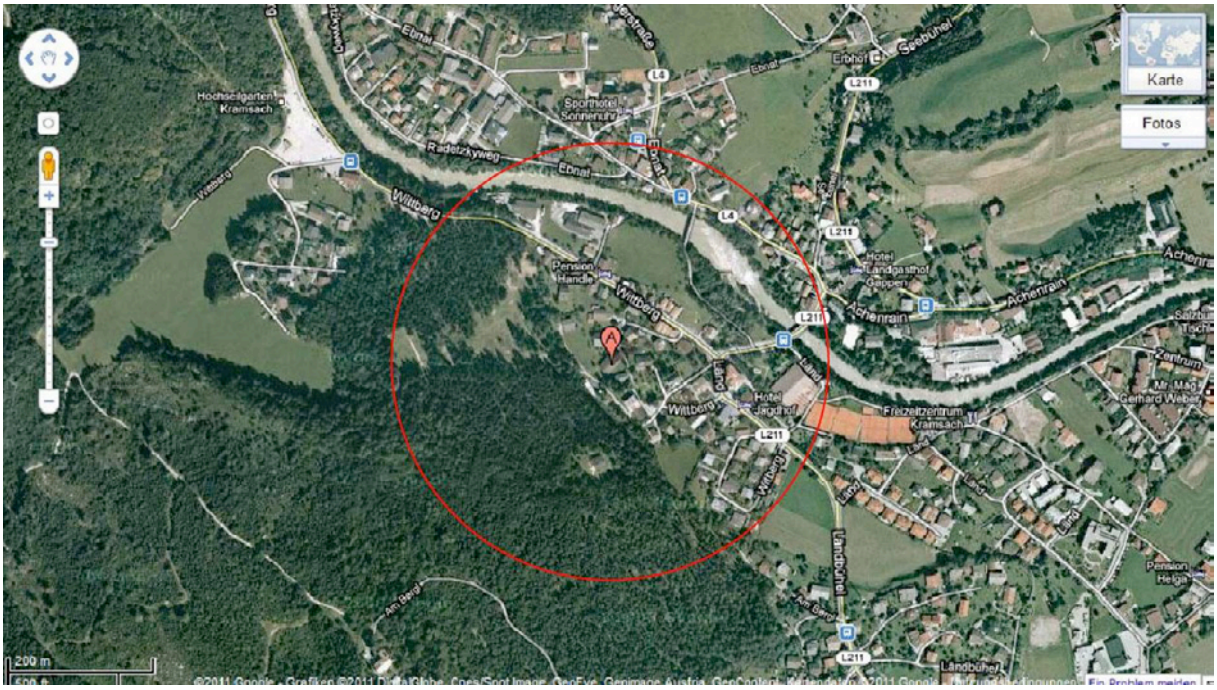
Some additional tools would make it easier to handle the ENERBUILD-tool. At the moment some calculations are very complex. For this reason some architects or planners may be discouraged to do the evaluation. It would also be helpful to do trainings for planners who want to work with the ENERBUILD-tool. Some additional or other criteria for reconstructed buildings should be added.

Detailed evaluation of criteria

A Quality of location and facilities

A 1 Access to public transport network

The public transport was evaluated within the surrounding bus stations in a diameter of 300 meters. There are two bus-stations with an hourly frequency serving the kindergarten with the next village.



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

EB-Points	max. Points	**obtained Points**
	50	**12**

A 2 Ecological quality of site

The function of the site was not changed. The new kindergarten was built in the courtyard of the existing kindergarten.

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

EB-Points	max. Points	**obtained Points**
	50	**50**

B Process and planning quality

B 1 Decision making and determination of goals

An architectural competition was carried out and a documentation of the decision making process exists. Different variants have been studied and evaluated in the planning phase.
The 0-variant was evaluated and considered as not relevant.

Criteria	Max. Points	Obtained Points
Exists a documentation of the decision making process?	10	10
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	4
Does it contain:		
Urbanism	2	2
Access to public transport	2	0
Use of area and floor	2	2
Energy efficiency	2	0
Ecological use of materials	2	0

EB-Points	max. Points	**Obtained Points**
	25	**25**

B 2 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 no limit for the energy consumption for heating. In the architectural competition they only wanted an energy efficient building (without a limit).
- After the competition the winning planner proposed to build the kindergarten as a Passive House with 15kWh/m²a.
- Also primary energy consumption where fixed within the passivehouse label with 120 kWh/m²a.
- The air tightness was fixed within the passive house label: 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 building at the moment is being certified as a Passive House with the criterias of the PHI Darmstadt.

EB-Points	max. Points	**Obtained Points**
	25	**10**

B 3 Standardized calculation of the economic efficiency

The life cycle costs and the economic efficiency were not calculated in the planning phase, but it were chosen materials with a long life time and low costs of maintaining.

EB-Points	max. Points	**Obtained Points**
	40	**0**

B 4 Product-management - Use of low-emission products

There were no criterias in the architectural competition for the use of low-emission products. During the construction, the planner decided to use low-emission products in parts of the building (roof construction, floor, furniture etc.)

Criteria	Max. Points	Obtained Points
Exists a documentation of the ecological optimization of the materials during the planning phases?	10	5
The tender for all craftworks have been declared ecologically? 100% of works 90% of works 70% of works	 20 15 10	 5
Have all products of all craftworks been declared ecologically? 100% of works 90% of works 70% of works	 30 20 10	 10
Does an ecological building supervision exist? Did the supervisor do regularly inspections on the building site? - Total construction process. - Parts of the construction process.	 20 10	 5

EB-Points	max. Points	**Obtained Points**
	60	**25**

B 5 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**

B 6 Information for users

A user manual does not exist for the building. However when the building was delivered an informative meeting was held to inform the teachers and pupil about the use of shadings and window ventilation. Also the caretaker was instructed and he still participates in training to optimize the operation of the building.

EB-Points	max. Points	**Obtained Points**
	25	**15**

C Energy & Utilities

C 1 Specific heating demand (PHPP)

Specific heat demand: 14 kWh/m²a

EB-Points	max. Points	**obtained Points**
	100	**100**

C 2 Specific cooling demand (PHPP)

Specific cooling demand: 0 kWh/m²a

EB-Points	max. Points	**obtained Points**
	100	**100**

C 3 Primary energy demand (PHPP)

Specific primary energy demand: 120 kWh/m²a

EB-Points	max. Points	**obtained Points**
	125	**125**

C 4 CO2-emissions (PHPP)

CO2-emissions: 40 kg/m²a

EB-Points	max. Points	**obtained Points**
	50	**37**

D Health and Comfort

D 1 Thermal comfort in summer

Criteria	Points
Building with less than 35 % Windows surfaces and without active cooling system	
- Analysis based on ON B8110-3	50
- Or analysis OIB RL-6; KB* < 0,4 kWh/m³a	50
- Or analysis OIB RL-6; KB* < 0,6 kWh/m³a	35
- Or Analysis PHPP, Überschreitung 26 °C < 5 %	65
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: 2.136 m² of opaque surfaces and 359 m² of transparent surfaces. 14,3% 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: 5 %

EB-Points	max. Points	**obtained Points**
	150	**65**

D 2 Ventilation – non energetic aspects

Criteria	Points
Sound transmission calculation (depending on the room use), prognostic of expected sound presser level LA,nT < 30 dB and LC(50-4000),nT < 50 dB	25
Sound emission calculation on most exposed working place LA,nT < 30 dB and LC(50-4000),nT < 50 dB	40
Sound emission calculation on most exposed working place LA,nT < 30 dB und LC(50-4000),nT < 50 dB	50

EB-Points	max. Points	**obtained Points**
	50	**25**

D 3 Daylight optimized (+ lightening optimized)

Result: Mean daylight factor: 3,8 %

EB-Points	max. Points	**obtained Points**
	50	**30**

E Building materials and construction

E 1 $OI3_{TGH-Ic}$ ecological index of the thermal building envelope (respectively OI3 of the total mass of the building)

Die Punkte für die Bewertung im Programm ENERBUILD werden mit folgender Formel aus dem $OI3_{TGH-BGF\ WG\ Ref.}$ -Wert zwischen 38 und 295 berechnet:

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

Punkte = 2 * (0,0007 * 217 ² - 0,623 * 217 + 123) = **42 Punkte**

$OI3_{TGH-BGF\ WG\ Ref.}$ –Werte ≤ 38 → 200 Punkte

$OI3_{TGH-BGF\ WG\ Ref.}$ –Werte ≥ 295 → 0 Punkte

EB-Points	max. Points	**obtained Points**
	200	**42**