Kita Karoline Goldhofer [EN]

by heilergeiger architekten / 2021-02-11 15:25:21 / Deutschland / 104 / DE

Building Type : Preschool, kindergarten, nursery
Construction Year : 2019
Delivery year : 2019
Address 1 - street : Berwangweg 10 87700 MEMMINGEN, Deutschland
Climate zone : [Dfb] Humid Continental Mild Summer, Wet All Year

Net Floor Area : 865 m^2 NGF
Construction/refurbishment cost : 1 €
Cost/m2 : 0 €/m^2

Primary energy need :

44 **kWhpe/m^2.year**

(Calculation method : Other)

ENERGY CONSUMPTION

Economical building *Building*

- < A
- 51 à B
- 91 à C
- 151 à D
- 231 à 330 E
- 331 à 450 F
- > 450 G

Energy-intensive building

Description

The structural concept for the day-care centre developed by heilergeiger architekten stems from the Reggio pedagogy applied in the centre. Here, reuse of the used and careful handling of the existing are of social and ecological value. This can be experienced by the children in the architecture of the day care centre. It is elementary that we do not work against the weaknesses of the existing building, but with its strengths.

The three parts of the old residential building are preserved, exposed and placed under a new shell of polycarbonate panels. The resulting spaces in between are room extensions for the day-care centre functions and an element of the sustainable energy concept. The new shell is a collector of light and energy. It allows the existing walls to remain uninsulated and as a historical layer. The energy concept is a cybernetic interplay of space, construction and use. By saving "grey energy", building materials and a CO2 reduction that already meets the 2050 climate target, the strengths of the existing and the used are also activated for climate protection in the sense of Reggio pedagogy.

The concept of reusing and activating can be experienced: the materiality and details of the existing building remain as found. Added construction is visibly raw. New furniture from the carpenter supports the use of the old.

The day-care centre is looking for architectural answers to the relevant questions of building: How do we use existing buildings and conserve resources? How do we reduce CO2 and gain space? How can climate protection be experienced as enrichment?

See more details about this project

https://www.heilergeiger.de/objekt/reggio-orientierte-kindertagesstaette-der-alois-goldhofer-stiftung-memmingen/
https://www.balthasar-neumann-preis.de/
https://www.hanssauerstiftung.de/preis/hans-sauer-award-2020/
https://www.db-bauzeitung.de/db-metamorphose/wettbewerb-respekt-perspektive-2020/
https://eurosolar.de/de/index.php/text-medien/pressemitteilungen-eurosolar/2418-sechs-zukunftsweisende-projekte-gewinnen-den-deutschen-solarpreis-2020

Data reliability

Assessor

Photo credit

heilergeiger architekten und stadtplaner BDA
Pictures: Nicolas Felder

Stakeholders

Contractor

Name : Architekt: heilergeiger architekten und stadtplaner BDA
Contact : Kempten, post@heilergeiger.de

Construction Manager

Name : Architekt:heilergeiger architekten und stadtplaner BDA
Contact : Kempten, post@heilergeiger.de

Stakeholders

Function : Contractor

Alois Goldhofer Stiftung

Memmingen

Function : Others

Latz + Partner Landschaftsarchitektur

Kranzberg

Landscape architecture

Function : Structures calculist

IHW Beratende Ingenieure

Kempten

Function : Others

IB Güttinger mit Ifes Institut für angewandte Energiesimulation

Kempten/Köln

Clima engineering and 3d thermodynamic simulation

Function : Thermal consultancy agency

Güttinger Ingenieure GbR

Kempten

Function : Others

Kettner & Baur GmbH

Memmingen

Electrical planning

Function : Others

Generation Licht

Gaienhofen/ Hemmenhofen

Lighting design

Function : Others

Anwander GmbH & Co. KG

Sulzberg

Brandschutzplanung

Function : Others

Owner approach of sustainability

By retaining as much of the existing building stock as possible at 75%, the additional "grey energy" required is reduced. This means that all the energy already consumed, which is required for the production, transport and installation of building materials, is saved by using the existing building stock. Together with an average renewable share of 82 % for heating and cooling, the strengths of the existing building stock are thus activated for climate protection. Thus, the energy concept also follows the Reggio idea. The CO2 consumption of 4.98 kg/m²a corresponds to the climate target 2050, a 90% reduction of the current consumption to 5 kg/m²a.

Architectural description

Concept

The concept for the day care centre originates from the Reggio pedagogy applied in it, which was deliberately chosen by the Alois Goldhofer Foundation. This pedagogy can be traced back to the time after the end of the Second World War when the citizens of the Italian town of Reggio nell'Emilia found a tank, sold its individual parts and used the proceeds to finance the construction of a kindergarten. This also gave rise to an essential element of the Reggio pedagogy of reusing used objects and dealing with them creatively.

Reuse of the used

Reuse of the used and careful handling of the existing are also of social and ecological value. This can be experienced by the children in the architecture of the day care centre. An elementary aspect is that we do not work against the weaknesses, but with the strengths of the existing building.
To this end, the old house of the donor family is being used and its substance activated. The project thus supports circularity in building. The avoidance of additional "grey energy" and the sustainable conservation of resources are in the foreground. The "as-found principle" - the examination of what is found in everyday architecture - as an architectural theoretical position of Alison and Peter Smithson - also follows this approach.

Cybernetic energy concept and sustainability

For this reason, the three existing parts of the old residential building are retained, freed up and placed under a new shell of polycarbonate multiwall sheets.

The spaces created between the old and the new - formerly outdoor space, now indoor space - serve as communal areas with flexible use in the day-care centre's daily routine and are part of the sustainable, cybernetic energy concept. They are used intermediate spaces, but also "energy gardens" (Günter Pfeifer).

The envelope made of recyclable polycarbonate is a collector of light and energy and allows the existing walls to remain uninsulated and to be experienced as a historical layer. The energy concept is a cybernetic interplay of space, construction and use. This makes it possible to solve the energy renovation - as an alternative to "ETICS" - architecturally, spatially.

In the cold seasons, the passive solar energy gained by the façade as a "solar collector" is used for heat management and controlled ventilation. The façade acts as passive solar to precondition the fresh air. The energy obtained via the photovoltaic system is converted directly into heat and used to operate the heat pump and lighting. In summer, the storage mass of the existing building and a rainwater cistern support the cooling of the house. Operating and follow-up costs are thus minimised. The roof area is extensively greened and thus contributes to the longevity of the construction and the improvement of the microclimate.

By retaining as much of the existing building as possible (75%) and thus reducing additional "grey energy", as well as a renewable share of 82% on average for heating and cooling, the strengths of the existing building are activated for climate protection. Thus, the energy concept also follows the Reggio idea. The CO2 consumption of 4.98 kg/m²a corresponds to the climate target 2050, a 90% reduction of the current consumption to 5 kg/m²a.

Activation of the existing building

The day-care centre is entered via the "piazza", the central Reggio meeting point between old and new.

The former living spaces are now group and ancillary rooms of the day care centre. The garage provides space for the new kitchen. The dining room is served via its former doorway.

The crèche is located in the former swimming pool. There, the children can climb down into the old pool in a playhouse.

From the "piazza", following the terrain gradient, a generous staircase and a slide lead to the two-storey multifunctional and play room on the lower garden floor. In the adjacent "Remida", recycling material is stored that the children work with in the studios and the day-care centre workshop.

The concept of reuse and activation can be experienced: the materiality and details of the existing building remain as found. Completed construction is visibly raw. New furniture from the carpenter supports the use of the old.

The reuse of the existing is also continued in the landscape architecture.

The garden in the former park of the Stifter estate can be reached from both floors. Movement and play between the old trees and on the spacious lawn are well possible here.

Plots built with stone slabs, concrete posts and wooden logs from the existing structure and filled with recycled materials can be used here by the children in play and experimentation.

Transferability for the relevant questions of construction

The transferability of the concept lies in the search for architectural answers to the relevant questions of building: How do we use existing buildings and conserve resources? How do we reduce CO2 and gain space? How can climate protection be experienced as enrichment?

In this context, the cybernetic interaction between existing buildings, shells, use, energy and space is explored holistically. "With the cybernetic principle, the available energetic resources (...) are brought together in such a way that they complement each other in their effect. The elements for this are primarily of architectural structure and are to be promoted to mutual benefit with as little support as possible by technical means." (Günter Pfeifer)

The question of energy generation is answered spatially and not solely in technical-constructive terms. It is experienced by the residents in their own bodies and as a spatial offer. The reuse of used building fabric and its continued use in everyday life as well as the spatial-architectural energy concept are innovation strands worth pursuing. This design concept can contribute to supporting the ecologically necessary change in building.

Social sustainability was also considered in the day care centre. In order to secure the care of the children with trained attendants in the long term, the city of Memmingen, with the support of the Alois Goldhofer Foundation, trains its teams in Reggio pedagogy. Since the day care centre is also close to the local industrial area, it thus also offers places for the district and the employees of the nearby industrial companies.

In addition, the communal and multifunctional spaces are open to other user groups in the neighbourhood and the city.

Energy

Energy consumption

Primary energy need : 44,00 kWhpe/m^2.year

Primary energy need for standard building : 232,00 kWhpe/m^2.year

Calculation method : Other

CEEB : 188

Final Energy : 29,00 kWhfe/m^2.year

Initial consumption : 434,00 kWhpe/m^2.year

Envelope performance

More information :

The spaces created between the old and the new - formerly exterior, now interior - function as used intermediate spaces, but also as "energy gardens" (Prof. Günter Pfeifer). In order to investigate the solar gains, the interior temperatures and the summer thermal insulation of the daycare centre in relation to the new envelope and the storage mass of the existing building, a 3-D thermodynamic simulation of the building was carried out throughout the year. On this basis, the parameters for the envelope made of recyclable polycarbonate were determined. To ensure optimal light and energy yields at all times, this was developed as a single- or double-skin façade and its different degrees of translucency with corresponding energy transmittance values. The new envelope is thus a collector of light and energy and allows the existing walls to remain uninsulated and as a historical layer.In the cold seasons, the passive solar energy gained through the façade as a "solar air collector" is used to heat the rooms and precondition the fresh air. The energy obtained via the photovoltaic system is directly converted into heat for the remaining heating energy demand and used to operate the heat pump and lighting. In summer, the storage mass of the existing building, the night flushing system and a rainwater cistern support the natural cooling of the house.The energy concept is thus an interplay of space, light, existing building and use. By retaining as much as possible of the existing building stock (75 %) and thus reducing additional "grey energy", its strengths are used for climate protection. The regenerative share for heating and cooling is 82 %. The CO2 consumption of 4.98 kg/m²a is already in line with the 2050 climate target. Accordingly, the integrated planning holistically follows the Reggio idea of appreciating and activating what already exists.

Users' control system opinion :

The accompanying monitoring provides the engineers with precise usage data. With the help of this data, a digital twin of the building is fed. A dashboard provides precise processes and energy quantities and can be used to optimize the system. With the help of this data on progress and energy consumption, the previous simulation is compared with reality and the building automation is optimized. The current trend in monitoring shows that the planned energy consumption has not been achieved.

Renewables & systems

Systems

Heating system :
- Heat pump
- Low temperature floor heating

Hot water system :
- Heat pump

Cooling system :
- Water chiller
- Radiant ceiling

Ventilation system :
- Natural ventilation
- Nocturnal ventilation
- Nocturnal Over ventilation
- Single flow

Renewable systems :
- Solar photovoltaic
- Other, specify
- Heat pump

Renewable energy production : 82,00 %

See "Performance of the building shell"

Environment

Water management

The extensive greening of the flat roof serves to retain rain. The remaining portion is collected in a garden rainwater cistern with a capacity of 12,000 litres. The cistern is also integrated into the building's energy concept: The rainwater collected and stored in the cistern at a constant temperature of approx. 12-14 degrees °C is used to pre-heat the supply air in winter and adiabatic cooling in summer.

Indoor Air quality

The construction process was accompanied by a suitably qualified pollutant expert. Thus, construction-accompanying pollutant management of new building materials and materials was carried out with the focus on the use of low-emission building materials and products. Extract from the product criteria z. B. free of plasticizers and solvents, EC1 / EC1plus, EC1-R / EC1plus-R, Giscode PU10, Ö10, Ral-ZU 123, 113, no chemical wood protection in the interior etc.
All materials in the existing building were also examined for pollutants such as PAHs, PCBs, lindane, etc. All uncontaminated materials were kept / reused, all contaminated materials properly demolished and disposed of.

To ensure quality, an indoor air measurement was carried out 4 weeks after the construction was completed and the building was occupied.

The measurement took place during normal operation of the ventilation system:
Sampling according to DIN EN UISt 16000 parts 1,2,35,6
Examination parameters. VOC and formaldehyde

TVOC according to ad hoc: Results all in the range <200 ug / m^3
Formaldehyde all results <15 ug / m^3

Health & Comfort

Health & comfort :

All materials from the existing building that had been checked for pollutants were retained or reused.
A conventional composite thermal insulation system was not used for energy refurbishment.
The building is characterised by the greatest possible avoidance of composite materials, direct use of materials such as polycarbonate (100% recyclable, partly as regranulate), steel, new masonry and the visible leaving of existing masonry, lime plaster, mineral paint, concrete, linoleum flooring, wooden fixtures and furniture.
The surfaces of the materials used were largely used without further surface treatment.

Measured indoor CO2 concentration : 810ppm
Measured thermal comfort : Innentemperaturmessung Winter 20°C, Innentemperaturmessung Sommer 25,2°C
Acoustic comfort :

The acoustics are favored as many of the wall surfaces are not parallel to each other. This means that there is good mixing or diffusion of the sound from the design. The niches, open shelves, furniture in the room and the acoustic ceilings also contribute to better diffusion and thus acoustic behavior. The acoustic ceilings consist of a wooden substructure with sound insulation in the cavities. Visible wood wool acoustic panels serve as absorbers towards the room.

Daylight factor : Dm 7-10 % nach DIALux

Products

Product

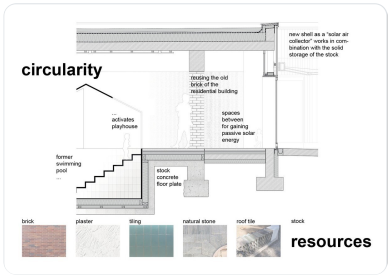
Polycarbonate multi wall sheets

Rodeca GmbH

Rodeca GmbH, Freiherr-vom-Stein-Straße 165, D-45473 Mülheim an der Ruhr, info@rodeca.de

Product category : Rohbau / Struktur, Mauerwerk, Fassade

Polycarbonate is a crystal clear, high impact thermoplastic with a temperature resistance of -40 to + 115 ° C, briefly up to 130 ° C. Its impact strength is almost constant over this temperature range. The many different product variants offer flexible design options in terms of shape, color and function. The sheets offer good long-term behavior thanks to UV protection and are translucent and heat-insulating. They are used as facade cladding, round facades, in sports and commercial halls, in interior construction, especially trade fair construction or room division, as well as in wall and roof renovations. Polycarbonate can be 100% recycled.



Costs

Building Environnemental Quality

Building Environmental Quality

- Building flexibility
- indoor air quality and health
- biodiversity
- consultation - cooperation
- comfort (visual, olfactive, thermal)
- energy efficiency
- renewable energies
- maintenance
- building end of life management
- integration in the land
- building process
- products and materials

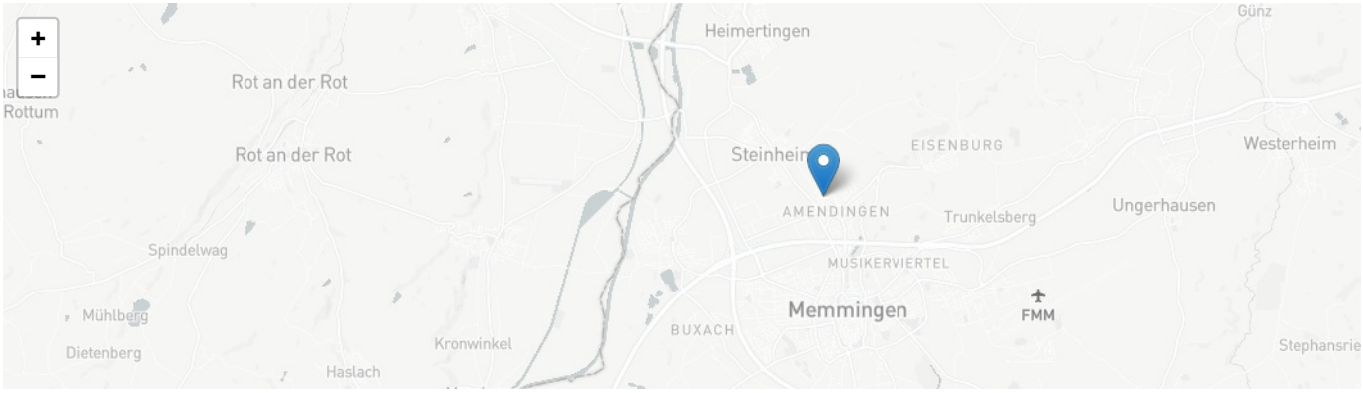
Contest

The building is particularly concerned with the "concern for the existing". The existing stock was activated and materials that had been dismantled outside were reused. By using the potential of the existing building, 75% gray energy could be saved.

The building is particularly concerned with the "concern for the existing building stock". The existing building stock was activated and deconstructed materials were reused in the exterior. By using the potential of the existing building, 75% of grey energy could be saved.

The spaces created by placing the old parts of the building under the new shell of polycarbonate web panels are an extension of the space for the day-care centre functions and an element of the sustainable energy concept. The new envelope is a collector of light and energy. As a passive solar façade, it allows the existing walls to remain uninsulated and as a historical layer. As an active solar component, the PV system on the roof contributes to regenerative energy production. The energy concept is a cybernetic interaction of space, construction and use. By saving "grey energy", building materials and a CO2 reduction that already meets the

Alle Kategorien



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