

BEST PRACTICE IN AUSTRIA – ENERGY EFFICIENT CITIES

BASIC INFORMATION

Title of the Best Practice

Renovation of the primary school Bad Eisenkappel

Energy efficiency measures implemented in the building: thermal energetic renovation, optimization of lighting system

Location:

City: Bad Eisenkappel

Region: Province of Carinthia

Country: Austria

GoogleMaps link:

<https://goo.gl/maps/MuJcKK3Zf1F2>

Partners involved:

- Owner and Operator: Immobilienverwaltung Schulzentrum Völkermarkt KG, Ritzingstraße 33, 9100 Völkermarkt; Contact: Mag. Daniela Leiter-Kuschnig, office@sgv-voelkermarkt.at
- Planner and Architect: halm.kaschnig.wührer architekten, Kaiser-Josef-Platz 5, 8010 Graz
- Building technology planning: HONESTA e.U., Ingenieurbüro für Gebäudetechnik, Auenfischerstraße 42, 9400 Wolfsberg; <https://mustersanierung.at/projekte/schulen-kindergaerten/Hauptschule-Bad-Eisenkappel/>

Implementation year: 2014

Photo:



Source: <https://mustersanierung.at/projekte/schulen-kindergaerten/Hauptschule-Bad-Eisenkappel/#&slider1=2>

SYSTEM CHARACTERISTICS

Brief Description:

The "Immobilienverwaltung Schulgemeinerverband Völkermarkt KG" carries out a thermal renovation of the secondary school in Bad Eisenkappel. Due to demographic developments, the number of pupils has fallen sharply in recent years. In order to preserve the regional infrastructure, it was decided to carry out a general renovation. The future utilisation concept provides for the accommodation of the Neue Mittelschule and the Volksschule Bad Eisenkappel. The music school, the local afternoon care and a library will also be integrated.

The building shell will be thermally improved by 18 cm of mineral wool plaster boards (U-value from 0.78 W/(m²K) to 0.16 W/(m²K)). Also the earth-facing ground will be insulated with 13 cm XPS or EPS (U-value from 2.82 W/(m²K) to 0.25 W/(m²K)). The existing windows with an average U-value of 2.56 W/(m²K) will be replaced by new aluminium windows with a U-value of 1.21 W/(m²K). Shading is provided by centrally controlled external Venetian blinds.

Heating will continue to be provided via the local heating network. Only the configuration must be changed due to the measures (mechanical ventilation and exhaust system for the lounges with 85% heat recovery; reduction of the building heating load) to nine heating groups with demand-oriented control. Hot water is produced decentrally.

Due to the new full thermal insulation and the ventilation system with heat recovery, as well as the zone-related heating regulation, the specific heating demand (HWB*) drops from 31.57 kWh/(m³a) to 5.95 kWh/(m³a).

To increase electrical energy efficiency, the lighting system is optimised by using LEDs and efficient fluorescent lamps. By changing the lighting, 5 MWh of energy can be saved annually. However, due to the installation of the controlled aeration and ventilation system, the energy requirement hardly changes.

FINANCIAL SOURCES AND FINANCING DETAILS

Total investment value: 5.300.000 €

Investment scale

Thermal reconstruction of the building envelope:

- The outer masonry consisting of 35 cm solid brick was thermally improved by 18 cm mineral wool plaster base boards (U-value from 0.78 W/(m²K) to 0.16 W/(m²K)). The ground level is also insulated with 13 cm XPS or EPS (U-value from 2.82 W/(m²K) to 0.25 W/(m²K)).

Building material:

- Mineral wool plaster base boards for facade insulation
- EPS for ceiling to roof space
- XPS or EPS for newly erected ground adjacent to the ground

Windows:

- The existing windows with an average U-value of 2.56 W/(m²K) were replaced by new aluminium windows with a U-value of 1.21 W/(m²K).

Building technology:

- Space heating and water heating via district heating with biogenic heating energy were retained.
- Cooling: no requirement for cooling

- Ventilation system: In the course of the renovation, a mechanical ventilation system was installed in the school building to supply the main lounges with air. The efficiency of the heat recovery amounts to approx. 85%.
- Use of energy-saving lighting system.
- Monitoring has been installed. This serves for the optimal adaptation of the building to the user behaviour. In addition, parameters are provided which can be adjusted or regulated for energy optimisation by means of "remote maintenance".

Sources of financing: This project was co-financed by funding of the Austrian Climate and Energy Fund (Mustersanierung) with € 2.158.188,00; and by the Province of Carinthia and the Municipalities.

Electricity savings (MWh/year): 0; because of the additional ventilation system

Or fuel savings (kg or m3 or kWh or GJ): reduction of HWB from 125,1 to 23,4 kWh/m².y, this means a reduction of 81 %

Cost savings (EUR/year): 80 % heating cost reduction; +/- 0 electricity costs, because of the additional ventilation system

CO₂-savings: of 117 tons per year

PROJECT IMPLEMENTATION BENEFITS

Due to demographic developments, the number of pupils has fallen sharply in recent years. In order to preserve the regional infrastructure, it was decided to carry out a general renovation.

Since the number of pupils has currently fallen below 90, the use of synergies was a prerequisite for retaining the location as a school location.

The current utilisation concept provides for the accommodation of the secondary school and the primary school Bad Eisenkappel.

The music school, the local afternoon care and a school library were also integrated.

Energy cost reduction and accessibility were also requirements for the planning. It was the client's wish not to have to make any major changes after the sample renovation for the next 30-40 years.

Mechanical ventilation was a major topic in the target definition, whether centralised or decentralised. The negative experience of a ventilation system in a school that had just been implemented at that time had a strong influence on this discussion.

ADDITIONAL INFORMATION

The reduction of soil sealing and parking spaces in favour of green areas was welcomed by the pupils, but led to discussions as to whether sufficient parking spaces would be available after the renovation.

The design ideas (e.g. dark ceiling colour) of the architecture and the ventilation concepts led to many discussions in the initial phase. A balance between the preservation of the old appearance (e.g. floors and inventory in selected areas) was a concern on the part of the clients.