

BEST PRACTICE IN CROATIA – ENERGY EFFICIENT CITIES

BASIC INFORMATION

Title of the Best Practice

Low energy reconstruction of Primary school Brace Radic in Koprivnica

Energy efficiency measures implemented in the building:

building envelope insulation (walls, roof, windows and doors reinstallation according to RAL standard), heat recovery ventilation system, LED lighting

Location:

City: Koprivnica

Region: Koprivnicko - krizevacka County **Country:** Croatia

GoogleMaps link:

<https://goo.gl/maps/nSchqeACj72hMoBf8>

Partners involved:

- Primary school Brace Radic, Miklinovec street 6A, Koprivnica – role: user
- City of Koprivnica, Zrinski Square 1, Koprivnica – role: investor
- The Environmental Protection and Energy Efficiency Fund, Radnicka road 80, Zagreb – role: investor
- Competent d.o.o., Varazdin, Trakoscanska 5 - role: lead project designer
- Svenda gradenje d.o.o. – role: contractor

Implementation year: 2018

***Photo:** (source: photo taken by REAN)



Figure 1 Reconstructed Primary school in Koprivnica

SYSTEM CHARACTERISTICS

Brief Description :

The subject of this project was the reconstruction and refurbishment of existing Primary school Brace Radic in Koprivnica. The building was constructed in 1989. and since then, no major refurbishments or reconstructions have been made. The school board wanted to ensure better learning conditions for their students, so they approached to energy experts in order to improve energy efficiency of the building and also to achieve savings.

Reconstruction included:

- a) replacement of existing lighting with new LED lighting
- b) thermal insulation of external walls and roof
- c) existing windows dismantling and their reinstallation according to RAL standard
- d) mechanical ventilation with heat recovery

Thermal reconstruction of the building envelope

The outer wall which consist of 29 cm brick block was thermally improved by 14 cm thick rock wool layer (U-value from 1.24 W/m²K to 0.22 W/m²K) and the roof was also refurbished and insulated with 22 cm thick mineral wool layer – 12 cm thick glass wool layer between the roof rafters and 10 cm thick rock wool layer above the rafters (U-value from 0.50 W/m²K to 0.15 W/m²K). Existing PVC windows with an average U-value of 1.40 W/m²K were dismantled and reinstalled according to RAL standard. Ventilation with heat recovery was installed in all classrooms, so that a minimum of 25 m³/h of fresh air is provided per user through individual recuperator systems (24 pcs). Regarding the lighting system, all existing lighting fixtures have been replaced with the new LED lighting fixtures.

Building material

Mineral rock wool for facade insulation. Mineral rock and glass wool for roof insulation.

Windows

Existing PVC windows with an average U-value of 1.40 W/m²K were dismantled and reinstalled according to RAL standard..

Building technology

Ventilation system: regarding the refurbishment, a mechanical ventilation system with heat recovery was installed in in all classrooms, school kitchen and in school sports hall. The efficiency of the heat recovery amounts to approx. 80 %.

The project implies energy-efficient, sustainable refurbishment, using renewable energy sources, materials, constructions and systems that provide low energy consumption. Use of energy-saving lighting system.

Monitoring system has been installed. This allows energy consumption monitoring and also serves for the optimal adaptation of the building to the user behaviour.

FINANCIAL SOURCES AND FINANCING DETAILS

Total investment value:

1.390.828,00 € (EE works)

Sources of financing:

This project was co-financed by the Environmental Protection and Energy Efficiency Fund with 40 % of total investment and the rest was covered by the City of Koprivnica.

Electricity savings (MWh/year):

electricity savings in total 47.295,00 kwh per year, this means a reduction of 59 %.

Or fuel savings (kg or m3 or kWh or GJ):

reduction of energy needed for heating from 445.898,30 kWh/m² to 165.878,10 kWh/m², this means a reduction of 63 %.

Cost savings (EUR/year):

63 % heating cost reduction and 59 % electricity savings, or 20.000,00 € per year

PROJECT IMPLEMENTATION BENEFITS

This investment will provide numerous benefits such as quality learning conditions for students, low – energy costs, low CO₂ emissions, lower maintenance costs etc. Not only does a refurbishment reduce the level and cost of maintenance, it also provides the opportunity to introduce a variety of energy saving measures that will improve the overall efficiency of the building. These changes will lower the carbon footprint of the building and introduce state of the art renewable technologies. Energy cost reduction and low – energy standard were main requirements for the building refurbishment.

ADDITIONAL INFORMATION

Commitment of all people involved in this project enabled low-energy transformation of educational spaces for the benefit of staff, teachers and students.