

BEST PRACTICE IN CROATIA – ENERGY EFFICIENT CITIES

BASIC INFORMATION

Title of the Best Practice

Low energy reconstruction and repurpose of existing building in former military complex

Energy efficiency measures implemented in the building:

Building envelope insulation (walls, roof, new exterior windows and doors), heat pumps for heating and cooling

Location:

City: Koprivnica

Region: Koprivnicko - krizevacka County

Country: Croatia

GoogleMaps link:

<https://goo.gl/maps/oTfbmVsw89x>

Partners involved:

- Kampus d.o.o., Dr. Zarka Dolinara Square 1, 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
- Tehnika projektiranje d.o.o., Zagreb, Andreja Arezina Crnaric - role: lead project designer
- The consortium „Detono-Primiko“ – role: contractor

Implementation year: 2013

Photo:



Figure 1 Reconstructed building in in former military complex
(Source: University North student portal "Pressedan.hr"; <http://pressedan.unin.hr>)

SYSTEM CHARACTERISTICS

Brief Description:

The subject of this project was the reconstruction and repurpose of existing building in the former "ban Krsto Frankopan" military complex in Koprivnica for the purpose of forming a study space for the Media University - journalism studies, media design studies and business and management studies in media. Former military complex "ban Krsto Frankopan" is intended for the establishment of the University Campus. The Kampus complex is ultimately designed as a complex in the concept of zero carbon dioxide emissions. The Kampus complex is intended to be a complex of zero carbon dioxide emissions. The investor's request was that the building must be a low-energy building.

Reconstruction included:

- a) removing the existing wooden roof and forming a heat-insulated flat roof
- b) thermal insulation of external walls
- c) replacement of external windows and doors
- d) mechanical ventilation with heat recovery

Thermal reconstruction of the building envelope

The outer wall which consist of 38 cm solid brick or 30 cm brick block was thermally improved by 18 - 20 cm extruded polystyrene - XPS (U-value from 0.83 W/m²K to 0.14 W/m²K) and the outer wall of ventilated façade was thermally improved by 18 cm rock wool (U-value from 0.81 W/m²K to 0.21 W/m²K). The flat roof is also insulated with 24 cm extruded polystyrene - XPS (U-value from 1.24 W/m²K to 0.12 W/m²K). The existing wooden windows with an average U-value of 3.40 W/m²K were replaced by new PVC windows with a U-value of 1.16 W/m²K.

Building material

Mineral rock wool and extruded polystyrene (XPS) for facade insulation.
XPS for roof insulation.

Windows

The existing wooden windows with an average U-value of 3.40 W/m²K were replaced by new PVC windows with a U-value of 1.16 W/m²K.

Building technology

Space heating and cooling via heat pumps (water – air). Heat pumps are using ground water heat. Ventilation system: regarding the renovation, a mechanical ventilation system with heat recovery was installed in the university building to supply classrooms with air. The efficiency of the heat recovery amounts to approx. 82 %.

The project implies energy-efficient, sustainable reconstruction, 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:

1.000.000 € (EE works)

Sources of financing:

This project was co-financed by the Environmental Protection and Energy Efficiency Fund with 40 % of total investment and by the City of Koprivnica with 60 % of total investment.

Electricity savings (MWh/year):

0; because new heating and cooling system is using electricity (heating pumps)

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

reduction of energy needed for heating from 159.436,80 kWh to 62.028,58 kWh, this means a reduction of 61 %.

Cost savings (EUR/year):

61 % heating cost reduction, or 3.820,00 € per year

PROJECT IMPLEMENTATION BENEFITS

This investment will provide numerous benefits such as quality learning conditions for students, low – energy costs, low CO₂ emissions etc. Reconstruction and repurpose of the existing building will provide new space for the students of the Media University thus directly contributes to University complex expansion.

Energy cost reduction and low – energy standard were main requirements for the building reconstruction. It was the investor's wish to have a low – energy renovated building which will have low energy costs during the whole life-cycle of the building.

ADDITIONAL INFORMATION

The Kampus complex is intended to be a complex of zero carbon dioxide emissions. The concept implies the reconstruction of the existing buildings and the construction of new facilities according to the low - energy standard, the use of renewable energy sources and a space without use of motor vehicles on fossil fuels.