BEST PRACTICE IN CZECH REPUBLIC – ENERGY EFFICIENT CITIES

BASIC INFORMATION

Title of the Best Practice

Thermal renovation and reconstruction of the heat source in sports hall in Zubří

Energy efficiency measures implemented in the building:

Reducing heating demand: improving the heat insulation, reconstruction of the heat source and installation of the heat recovery ventilation in the whole sports hall

Location:

City: Zubří

Region: Zlín Region

Country: Czech Republic

GoogleMaps link:

https://goo.gl/maps/xkrcx4pMJF12

Partners involved:

Owner and Operator
Zubří (municipality)
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Implementation year: 2017

Photo:

Source: Energy agency of the Zlín region

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SYSTEM CHARACTERISTICS

Brief Description*:*

There were several reasons for the project implementation - improvement of the general state of the sports hall, the sanitation of the façade, indoor environment was very often unadvisable.

Municipality of Zubří decided for the complete reconstruction. With the support from the Energy Agency of the Zlín Region the municipality submitted the application for funding to the national Operational Programme Environment 2014-2020. The project was approved for funding. The final share of the subsidy was 21% from the overall investment costs.

The most important part of the project was the reconstruction of heat source and heat recovery ventilation of the whole building. Nowadays, the heating demand of the building is 44 kWh/(m2.a).

Smart metering of the all energy supplies has been installed.

Thermal reconstruction of the building envelope
The outer walls were improved by 20 cm mineral wool bachl EXTRAPOR 70F with lambda 0,031 W/(mK) (U-value from 0,686 W/(m²K) to 0.149 W/(m²K)). The ground level is also insulated with 23 cm DCD Ideal EPS NEO with lambda 0,031 W/(mK) (U-value from 2,9 W/(m²K) to 0,14 W/(m²K)).
The roof of the sports hall is insulated by the mineral wool of 50+410 mm thickness with lambda = 0,037 W/(m²K). The roof has now U = 0,12 W/(m²K)).

Windows and doors
The existing windows with an average U-value of 2,4 W/(m²K) were replaced by new plastic windows with a U-value of 0,73 W/(m²K). The new doors were improved to aluminum with U = 0,9 W/(m²K)). Finally the gates were improved to U = 1,1 W/(m²K)).

Building technology
Heating and hot water preparation is now being generated by 5 natural gas heat pumps with overall power of 179 kW. SCOP of the heat pumps is 1,42. This means 1 GJ of the natural gas produces 1,42 GJ of heat on average.

For the support of the heating two natural gas boilers with overall power of 73,4 kW are installed.

Cooling: no requirement for cooling

Ventilation system: There are 4 heat recovery units installed (16800 m3/h for the hall, 3000 m3/h for the minor hall, 2120 m3/h for dressing room and 500 m3/h for another dressing room)

Solar system: Solar system was installed before the project started, the yearly production is about 37 GJ.

Use of energy-saving lighting system – sponsored by private company ROBE Vsetín.

Energy monitoring has been installed. This serves for the optimal adaptation of the building to the users´ behavior.

FINANCIAL SOURCES AND FINANCING DETAILS

Total investment value:

1 950 000 €

Sources of financing:

This project was co-financed by the Operational Programme Environemt of the Czech Republic with subsidy € 415 000; and by Zubří municipality.

Electricity savings (MWh/year):

0; because of the additional ventilation system

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

Reduction of natural gas from 2147 GJ before project implementation to nowadays 1110 GJ, which means 44 kWh/(m2.a) for the heating.

Cost savings (EUR/year):

21 300 € per year; +/- 0 electricity costs, because of the additional ventilation system

PROJECT IMPLEMENTATION BENEFITS

Overall reconstruction of the sports hall significantly reduced consumption of the natural gas and improved the indoor environment as well as the outer design of the building.

Thanks to the reconstruction the sports hall has become the shop window of the municipality and the local handball club.

The reduction of the energy consumption and operational costs has the positive effect on a sustainable operation of the sports hall in the next 30 years.

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

ADDITIONAL INFORMATION

The sports life of the youth and adults in the hall varies significantly throughout the year from alternative hours of school gymnastics, handball youth and adult training, modern gymnastics, to indoor football, floorball, ballroom tournaments.

The most frequent users of the sports and teaching hall are Zubří Elementary School and the Zubří Handball Club.