

# DETMOLD VOCATIONAL COLLEGE

The buildings situated on the campus of the vocational colleges “Felix-Fechenbach-Berufskolleg” and “Dietrich-Bonhoeffer-Berufskolleg” at Detmold (Germany) will undergo exemplary retrofitting; after their renovation, these buildings will produce more energy than is actually needed for their operation. Three solid constructions are subject to retrofitting, the external walls of which will be insulated using prefabricated wooden elements that are to be mounted on the outside of the facade.



## GENERAL INFORMATION

Location:	Detmold, Germany
Project type:	Renovation
Net cost:	6,5 million EURO
Main contractors:	Brüggemann Holzbau GmbH & Co. KG and Krebbers GmbH & Co. KG
Architect:	pape oder semke Architekturbüro
Building owner:	Kreis Lippe(the district)
Gross floor area:	8 039 m <sup>2</sup> (total floor space of all three buildings)
Number of stories:	3-4
Construction time:	2014

## COOPERATION MODEL

The administrative district (Landkreis Lippe) will pay for the renovation, subsidies were granted by the German Federal Ministry for Economic Affairs and Energy.

The two main contractors were awarded the Europe-wide tender.

## TECHNICAL SOLUTIONS AT A GLANCE

- Plus-energy house standard
- District heating ((Biomass, residual wood, CHP)
- Roof-integrated PV system on top of all three buildings
- Central ventilating system with 85 % heat recovery (administration, the training restaurant and the hotel classes
- Decentralized facade oriented ventilation in all other classrooms. Heat recovery 85 %

## DESCRIPTION OF CONSTRUCTION

Construction before retrofitting ( $U=1,2 \text{ W/m}^2\text{K}$ ):

- 386 mm masonry, plastered on both sides

Construction after retrofitting ( $U=0,11 \text{ W/m}^2\text{K}$ ):

- 386 mm masonry
- 360 mm web girders/ I-joists ( $U_{\text{psi}}$ )
- 360 mm cellulose fibre
- 35 mm plaster base (wood wool building slab)
- 35 mm light-weight plaster







Co-funded by the Intelligent Energy Europe Programme of the European Union



## ENERGY DATA / SUPPLY

- Delivered energy need: 57 kWh/m<sup>2</sup>a (space heating, ventilation, domestic hot water heating, auxiliary energy (electric power) for the technical building installations), lighting).
- Final energy before renovation: 259,6 kWh/m<sup>2</sup>a  
Final energy demand after renovation: 56,7 kWh/m<sup>2</sup>a (78 % reduction)
- Primary energy need: 92 kWh/m<sup>2</sup>a (space heating, ventilation, domestic hot water heating, lighting)
- The consumption is covered by the yield of the PV system (346 kWp). The generated electricity is consumed on-site; any surplus electricity is fed into the public grid.

The district heat breaks down as follows:

- 55 % regenerative heat from an industrial biomass-cogeneration plant (combined heat and power generation, CHP)
- 10 % heat from peak load boilers
- 25 % regenerative heat from large-scale cogeneration plants (combined heat and power generation, CHP)

## VENTILATION AND INDOOR ENVIRONMENT QUALITY

- The centralized ventilation plant is regulated by a demand-responsive control system. Each space can be controlled separately, because every room has been provided with a presence detector and a CO<sub>2</sub> sensor. As the air is supplied through textile air-hoses, the flow noise will be reduced and the supply air will be introduced free of draught.
- The decentralized ventilation units in the classrooms are controlled by presence-detecting and CO<sub>2</sub>-dependent control systems.
- The energy saving fans achieve an efficiency of 0,4 Wh/m<sup>3</sup>.
- The heat is emitted into the spaces via radiators.
- Summer heat protection is ensured by means of an external shading system and via night-time ventilation.
- Each classroom is provided with a CO<sub>2</sub> detector.

Picture 1

The existing facades of the school buildings

Picture 2

Mounting of the prefabricated facades

Picture 3

Sketch of how the college will look like completed



## THE RENEW SCHOOL PROJECT WILL DISPLAY 18 RENOVATED OR NEW SCHOOL BUILDINGS ALL OVER EUROPE

The RENEW SCHOOL project aims at retrofitting a large number of school buildings to Nearly Zero Energy Building (nZEB) standard. The project will promote and increase high-energy performance and prefabricated timber-based renovation of school buildings in Europe.

The project assists municipalities, school owners/-financiers and companies with appropriate tools and solutions and offers exchange possibilities for them.

Integrated and multifunctional solutions are based on:

- Timber prefabrication (with integrated facilities)
- Ventilation (indoor air quality)
- Intelligent daylight / shading (control)
- Renewables (on-site or nearby)

The project has chosen 18 frontrunner buildings, presenting them to municipalities, school owners, companies and users as good examples and solutions for the renovation of existing school buildings to fully nZEB standard.



1. Romsdal Secondary School
2. Søreide Primary School
3. Risør Technical College
4. Baksippans Preschool
5. School CVO Heusden-Zolder
6. Detmold Vocational College
7. Gymnasium Reutershagen
8. Schwanenstadt
9. Rainbach
10. Neumarkt
11. St. Leonard
12. Tišina kindergarten
13. Lavrica kindergarten
14. Kekec kindergarten
15. Storžek kindergarten
16. Siemianowice
17. Vibeengen
18. Capriva del Friuli kindergarten

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