

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 mounted on the outside of the facade.





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



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 Architek- turbüro
Building owner:	Kreis Lippe(the district)
Gross floor area:	8 039 m ² (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
- Distict 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 ($U=1,2 W/m^2 K$):

• 386 mm masonry, plastered on both sides

Construction after retrofitting (U=0,11 W/m²K):

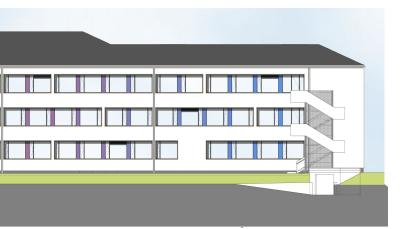
- 386 mm masonry
- 360 mm web girders/ I-joists (U_psi)
- 360 mm cellulose fibre
- 35 mm plaster base (wood wool building slab)
- 35 mm light-weight plaster













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

ENERGY DATA / SUPPLY

- Delivered energy need: 57 kWh/m²a (space heating, ventilation, domestic hot water heating, auxiliary energy (electric power) for the technical building installations), lighting).
- Final energy before renovation: 259,6 kWh/m²a
 Final energy demand after renovation: 56,7 kWh/m²a (78 % reduction)
- Primary energy need: 92 kWh/m²a (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 biomasscogeneration 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 CO₂ sensor. As the air is supplied through textile airhoses, 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 CO2-dependent control systems.
- The energy saving fans achieve an efficiency of 0,4 Wh/m³.
- 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 CO₂ detector.

Picture1

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

© pape oder semke Architekturbüro, Detmold



THE RENEW SCHOOL PROJECT WILL DISPLAY 18 RENOVATED OR NEW

SCHOOL BUILDINGS ALL OVER EUROPE

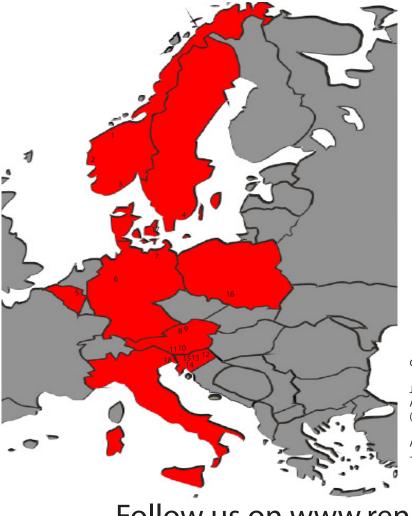
The RENEW SCHOOL project aims at retrofitting a large number of school buildings to Nearly Zero Energy Building (nZEB) standard. The project will promote and increase high-energy performance and prefabricated timber-based renovation of school buildings in Europe.

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.



- Romsdal Secondary School 1.
- Søreide Primary School Risør Technical College 2.
- 3.
- 4. Backsippans Preschool
- School CVO Heusden-Zolder 5.
- **Detmold Vocational College** 6.
- Gymnasium Reutershagen 7. Schwanenstadt
- 8. Rainbach
- 9. 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

CONTACT INFORMATION:

Johann Reiß, Fraunhofer-Institut für Bauphysik, Abteilung Wärmetechnik (johann.reiss@ibp.fraunhofer.de, +49-711-970-3337)

Armin Knotzer, AEE INTEC (a.knotzer@aee.at, +43-3112-5886-369) Coordination Renew School

Follow us on www.renew-school.eu

The sole responsibility for the content of this folder lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.



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