

VIBEENGEN PRIMARY SCHOOL

The school is a new school completed in 2014 for 500 pupils. The main energy related targets were to achieve the best Danish low-energy class. Partially prefabricated facades are used. The building employs both central and decentral mechanical ventilation in combination with natural ventilation for passive cooling. The energy sources are natural gas and PV's.





RENEW SCHOOL

GENERAL INFORMATION

| | |
|--------------------|-------------------------|
| Location: | Haslev, Denmark |
| Project type: | New building |
| Net cost: | 21,3 million EURO |
| Main contractor: | BNS |
| Architect: | Arkitema Architects |
| Building owner: | Faxe Municipality |
| Gross floor area: | 6 430 m ² |
| Number of storeys: | 2 |
| Construction time: | October 2011-april 2014 |

COOPERATION MODEL

Arkitema Architects and Søren Jensen Engineers won the architectural competition on the basis of a competition brief developed by the client advisor. The project was further developed involving users, municipality, and advisors. The construction was carried out in trade contracts by main contractor BNS. The project was funded by the municipality.

TECHNICAL SOLUTIONS AT A GLANCE

- Low-energy school building with the primary energy consumption of 41 kWh/m²
- Sinks only have cold water to minimize water consumption and standby energy consumption
- Partially prefabricated timber facade
- Hybrid ventilation (mechanical and natural)
- Pre-heating of intake air in ground ducts to avoid freezing of heat exchanger
- Extensive use of daylight, e.g. via skylights
- LED lighting
- Natural gas and PV

DESCRIPTION OF CONSTRUCTION

Partially prefabricated timber facades was used. The structural system is steel columns and beams with slabs and stabilizing walls of concrete. The prefabricated timber facades are made from 245+95 mm timber with the vapour barrier positioned in between the posts. The average U-value is 0,13 W/m²K.

Only cladding was mounted on site.





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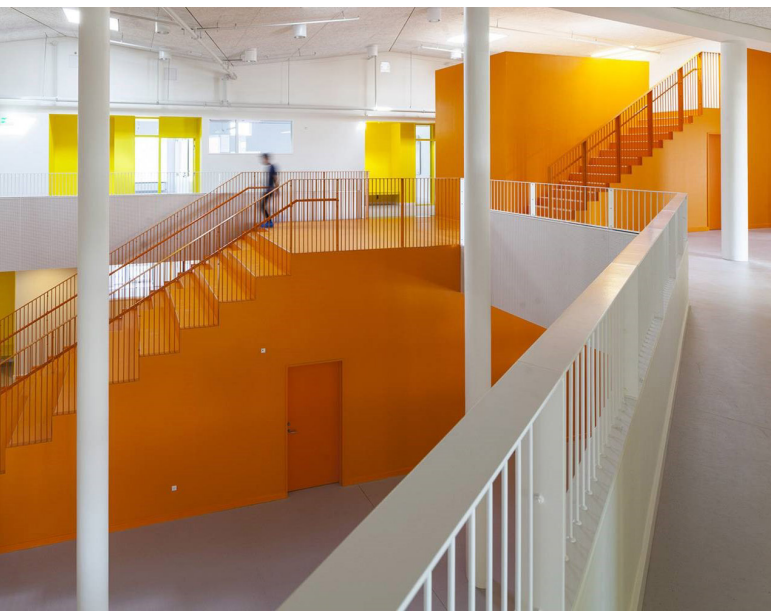
ENERGY DATA / SUPPLY

The school was planned as a low-energy building with a primary energy consumption of 41 kWh/m² GFAa.

Passive measures saves 56 % primary energy compared to Danish Building Code target at the start of the project. The installed PV system reduces it further to zero-energy consumption.

The total energy consumption of the school is measured and presented to pupils on the screen located centrally in the school. Detailed power consumption for ventilation, lighting and other equipment is monitored in three classrooms.

The energy is supplied by a boiler using natural gas, and 1435 m² PV's (435 m² on roof, 1000 m² on the ground).



VENTILATION AND INDOOR AIR QUALITY

The star-shape of the building is designed to augment the potential of hybrid ventilation.

During the heating season, the ventilation in sport and common areas are handled by central balanced mechanical units with heat recovery located in the basement. The fresh air intake is through a ground duct for pre-heating during freezing periods. In classrooms, decentralized balanced mechanical air handling units are designed for max 1000 ppm CO₂.

During summer and sunny periods, airing is handled by a combination of cross-side and stack-assisted natural ventilation, only supported sporadically by the me-



LESSONS LEARNED

The pre-fabricated facade solutions serves as best-practice and has been described and published in a guideline from the wooden industry.

Picture 1 Mantling of the prefabricated facades

Picture 2 Picture of the colourful indoor interior

Picture 3 Overview of the school buildings as planned

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. Bacsippans 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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