

ROMSDAL SECONDARY SCHOOL

Møre and Romsdal county Council adopted the school's building program in December 2012. The main energy related targets are to achieve passive house standard and energy label A, to use solid wood as the main material, to use "low-tech" ventilation systems (hybrid solution), to reduce the greenhouse gas emissions and achieve a 20 % reduction on investments and operating costs of technology.





RENEW SCHOOL

GENERAL INFORMATION

Location:	Molde, Norway
Project type:	New building (addition)
Gross cost:	51,67 million EURO (not incl. finance costs)
Main contractor:	Not decided
Architect:	HUS arkitekter AS and Ratio Arkitekter AS
Building owner:	Møre and Romsdal county Council
Gross floor area:	12 000 m ²
Number of stories:	3
Construction time:	Dec. 2012 - Aug. 2017

COOPERATION MODEL

The possibility study of the project was initiated through a project called "Tredrivaren i Møre og Romsdal", which is a cooperation between Innovation Norway, the County Governor and county Council of Møre and Romsdal, the Forest Industry Forum the Architect Association and Trefokus.

TECHNICAL SOLUTIONS AT A GLANCE

Building envelope:

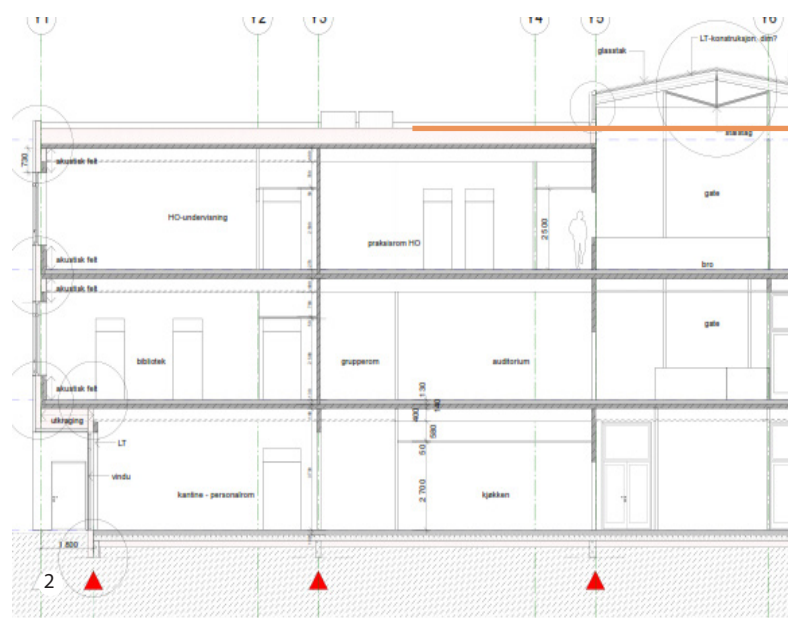
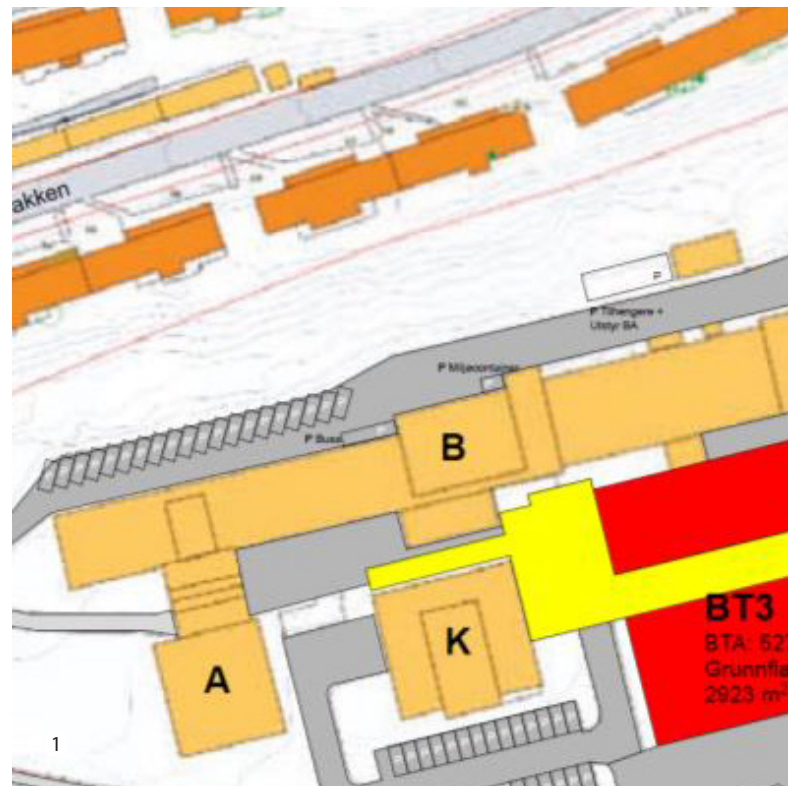
- Partially prefabricated timber facade
- High insulated facades – passive house level for energy consumption.
- Cold bridges reduced through use of timber constructions.
- Passive house windows U values < 0,8 W/m²K in average
- Airtightness 0,6 h-1

Indoor climate:

- Focus on indoor air quality, fulfilling EN- NS 15251 level 2.

Technical systems and energy supply:

- High efficiency energy supply. Ground coupled heat pump, COP > 3,5 for heating and > 15 for cooling (planned as an option).
- Efficient heat recovery on ventilations plant > 85 %
- Decentralized ventilation systems
- Low average SFP for ventilation through use of hybrid ventilation systems, SFP < 1,5 kW/m³/s
- Low Tech strategies in design of technical systems in order reduce maintenance and operation costs. Design is based on LCC optimization
- Diffuse ceiling inlet systems for 30% of the building area. A diffuse ceiling inlet system is supplying the air through the whole ceiling. The system can remove a large heat load without creating draught in the room.





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ENERGY DATA / SUPPLY

The school will fulfill passive house energy level. Passive house level is, delivered energy consumption below 20 kWh/m² TFA.

The goal for total delivered energy demand is 70 kWh/m² TFA.

The aim is to achieve energy label A.

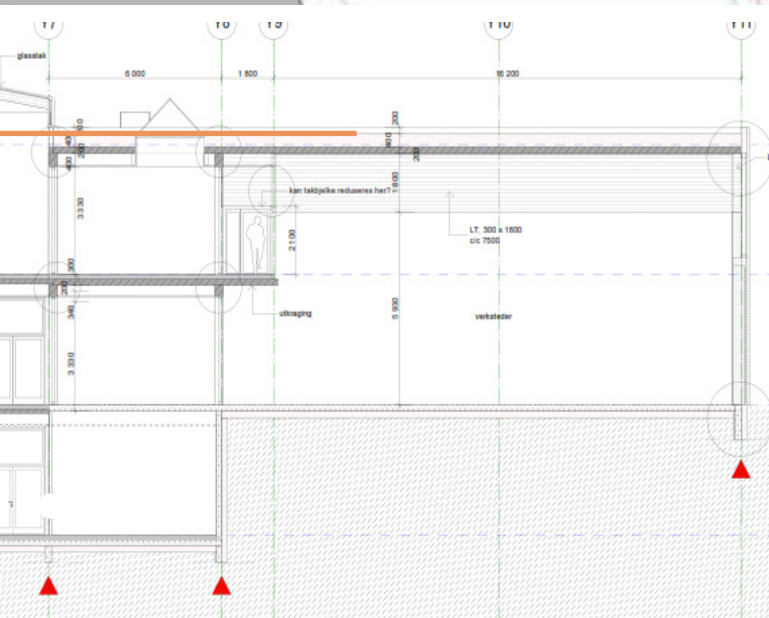
The energy supply is minimum 60 % renewable energy resources.

There is a focus on reducing the greenhouse gas emissions from embodied energy in structures and bearings system with 50 %.

DESCRIPTION OF CONSTRUCTION

Project objectives is:

- Focus on "Lean Construction", to industrialize the production and make the assembly on site as effective as possible.
- At least 50 % prefabrication of site.
- To use standardized and repeatable solutions
- To use massive wood as primary bearing system.



VENTILATION AND INDOOR ENVIRONMENT QUALITY

The overall objectives for the indoor environment is to fulfill indoor class 2, according to the NS-EN 15251:2007.

The overall goal for design of ventilations is to use Low Tech solutions, which in brief are systems design with focus on simple solution, and the combination of natural and mechanical ventilation. The building owner and the project group has defined Low Tech ventilation.

Low Tech ventilation is define as:

1. Low Tech ventilation should fulfill the indoor requirement.
2. Low Tech ventilation design should be based on LCC, optimizing energy cost, maintenance cost and investment cost.
3. Low Tech is and combination of mechanical and natural ventilation, using optimal strategy for different functions and areas in the building.
4. Low Tech ventilation enhance control solution and strategies with low complexity
5. Low Tech ventilation has 20 % lower investments and running cost.



Picture1

Development scheme for the new building, BT2 and BT3.

Picture 2

Cross section of the new building

Picture 3

The new school 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. 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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