

Borgen Community Centre

Retrofit and conversion of a school building into a community centre, comprising secondary school, library, health centre, kindergarden, youth centre and extra rooms for local community activities.



Main retrofit goals

- Good indoor climate
- Flexible floor plans that allow multiple use of the building
- Reduction of energy consumption by 50% or better
- Renewable energy resources



Building constructions

Roof construction was strengthened and insulation increased to an average thickness of 300 mm. Walls were completely rebuilt with 200 mm insulation. All windows were replaced by wood frames with outside aluminum cladding and high quality double-glazing with low emissive coating. Extensive use of sustainable materials with high thermal capacity. A new extension of about 2000 m² was added.

Heating

To optimize use of renewable energy, a geothermal heat pump was installed. Heat is pumped from the ground from 44 energy wells, all about 150 m deep. During summer it provides cooling by pumping excess heat back into the ground and thus "recharging" the wells. Heat is distributed by water to radiators under the windows. The heat pump is dimensioned for 60% of total needs. Two oil boilers are installed as a backup system, with sufficient capacity to heat the building and supply hot water if the heat pump should fail.

Ventilation

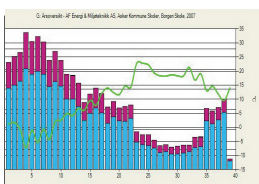
The main ventilation is based on a natural hybrid system with inlet towers and underground culverts for fresh air supply. Since we had an existing building, culverts had to be built outside along the foundations. From the culvert air is let into the room through specially designed grids. Air flow through each room is regulated by temperature and CO₂ sensors in each room and thereby adjusted to the actual needs. Exhaust towers are located over the central area in each base.

Lighting

Active use of daylight is used to reduce electric consumption. Raised sections in bases and the central area provide daylight in addition to the windows. To optimize the effect of daylight, all artificial lights are adjustable and regulated by light sensors. In addition, light is also regulated by motion sensors that will turn the light on when someone enters the room, if needed.

Energy saving

The goal was to reduce energy consumption by 50% or better. The old building had a total energy consumption of 280 kWh/m²/a. Energy monitoring during almost 2 years show a total energy consumption as low as 100 kWh/m²/a.



Germany: Stuttgart



Nursing Home
Filderhof

Great Britain: Plymouth



City College
Plymouth

Norway: Asker



Borgen
Community
Centre

Norway: Hagafoss



Church
Hol
Commune

Denmark: Copenhagen



Cultural
Centre
Proevhallen

Greece: Athens



Evonymos
Ecological
Library

Czech Republic: Brno



Social
Centre
"Brewery"

Lithuania: Vilnius



Main
Building
Vilnius
Gediminas
University