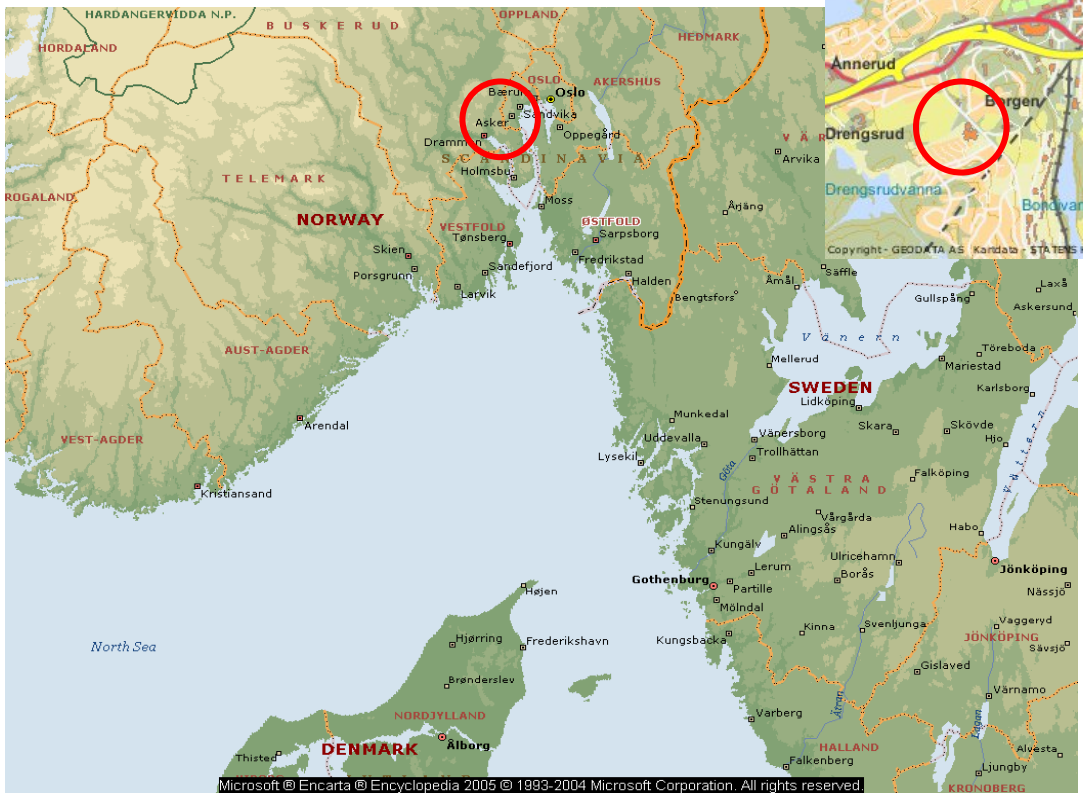
BORGEN COMMUNITY CENTRE

ASKER MUNICIPALITY

NORWAY

Location



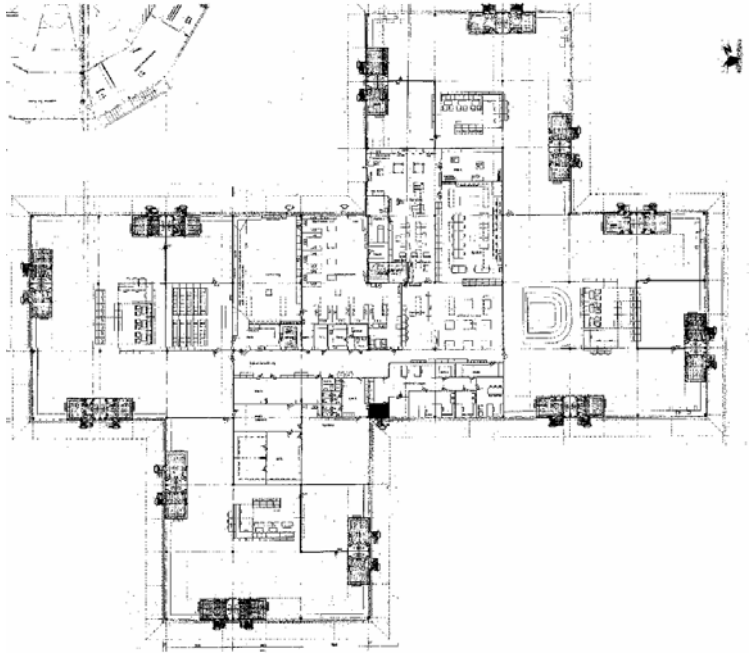
About 20 kms Southwest of Oslo

Secondary school
Kindergarten
Youth activity centre
Health care

Dental services and rooms for private organisations.

also: church and sports facilities

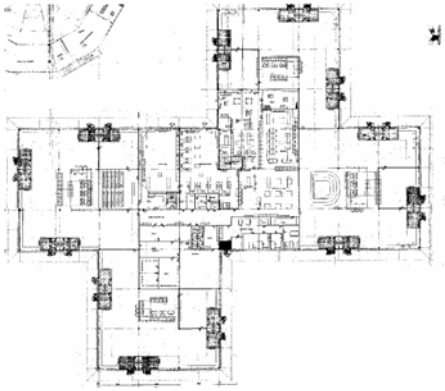
History:
Combined elementary and secondary school
Completed in 1971

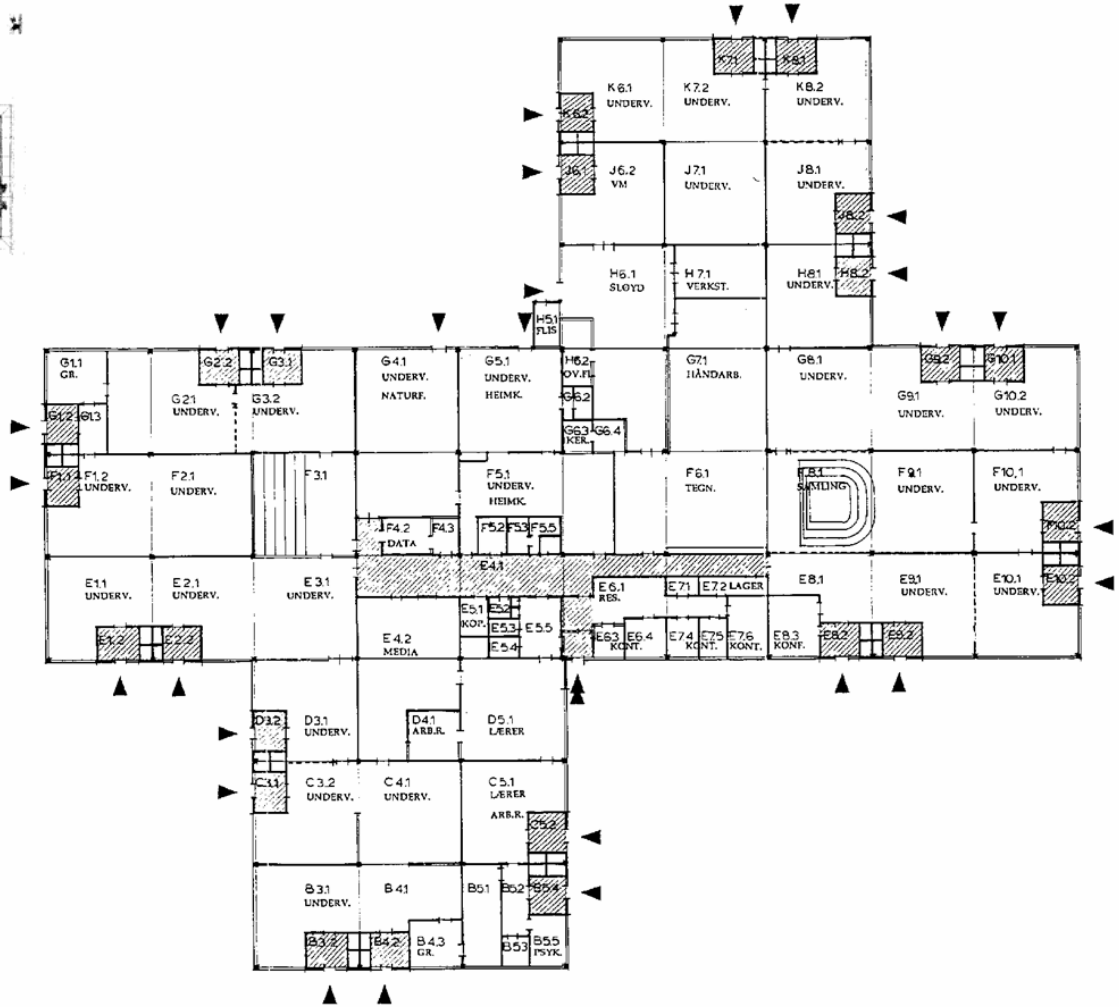


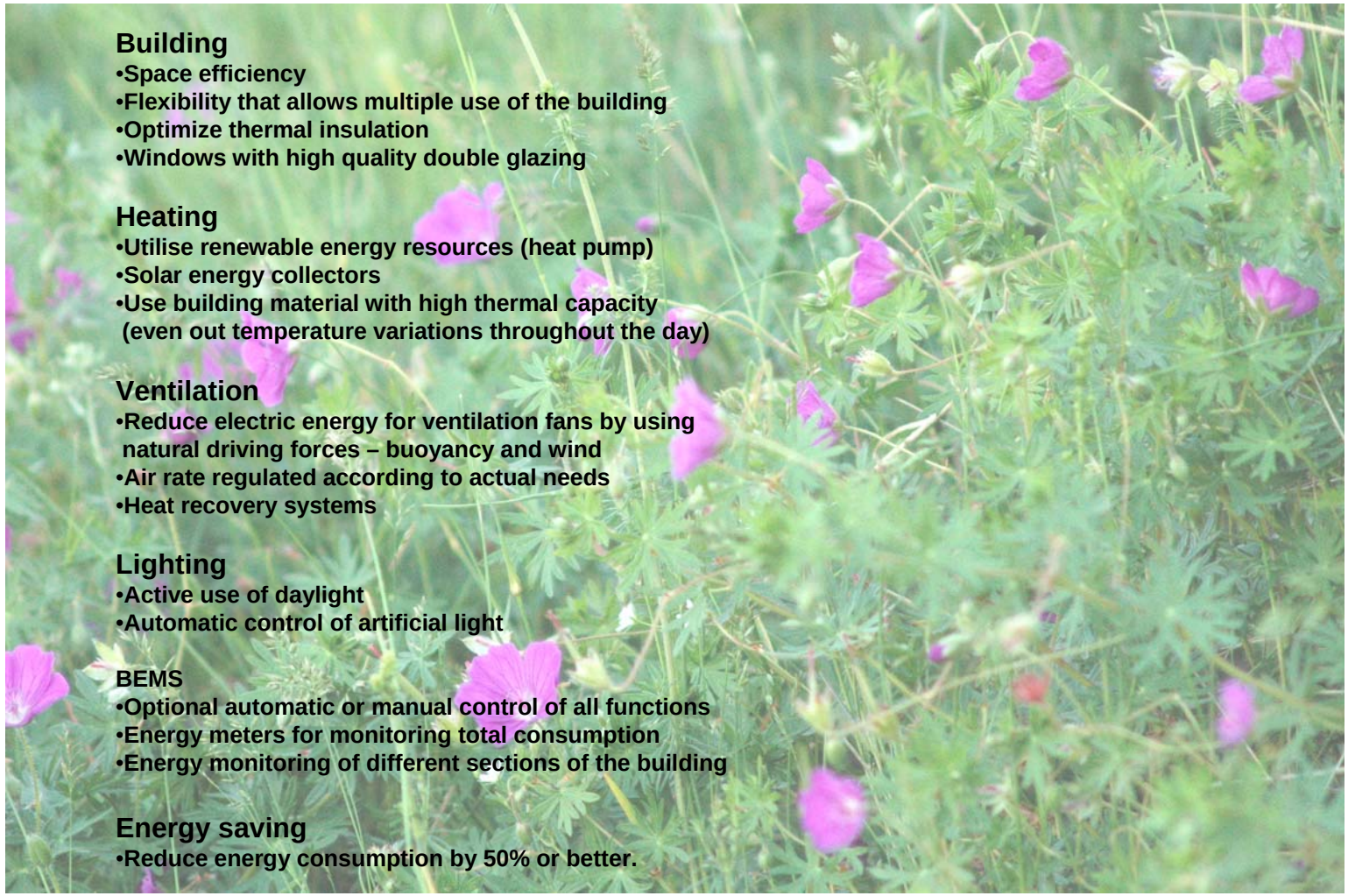
Open plan
Decentralized entrances
4000 m2

Insufficient insulation
High energy consumption
280 kWh/m2a

Poor daylight conditions
Inadequate ventilation
Worn down building envelope




K6.1 UNDERV.
K7.2 UNDERV.
K8.2 UNDERV.
J6.2 VM
J7.1 UNDERV.
J8.1 UNDERV.
H6.1 SLØYD
H7.1 VERKST.
H8.1 UNDERV.
G1.1 GR.
G2.1 UNDERV.
G3.2 UNDERV.
G4.1 UNDERV. NATURF.
G5.1 UNDERV. HEIMK.
G7.1 HÅNDARB.
G8.1 UNDERV.
G9.1 UNDERV.
G10.2 UNDERV.
F1.2 UNDERV.
F2.1 UNDERV.
F5.1 UNDERV. HEIMK.
F6.1 TEGN.
F9.1 UNDERV.
F10.1 UNDERV.
F4.2 DATA
E1.1 UNDERV.
E2.1 UNDERV.
E3.1 UNDERV.
E4.2 MEDIA
E6.1 RES.
E7.2 LAGER
E8.1
E9.1 UNDERV.
E10.1 UNDERV.
D3.1 UNDERV.
D4.1 ARB.R.
D5.1 LÆRER
C3.2 UNDERV.
C4.1 UNDERV.
C5.1 LÆRER ARB.R.
B3.1 UNDERV.
B4.1
B4.3 GR.
B5.5 PSYK.



Building
- Space efficiency
- Flexibility that allows multiple use of the building
- Optimize thermal insulation
- Windows with high quality double glazing

Heating
- Utilise renewable energy resources (heat pump)
- Solar energy collectors
- Use building material with high thermal capacity (even out temperature variations throughout the day)

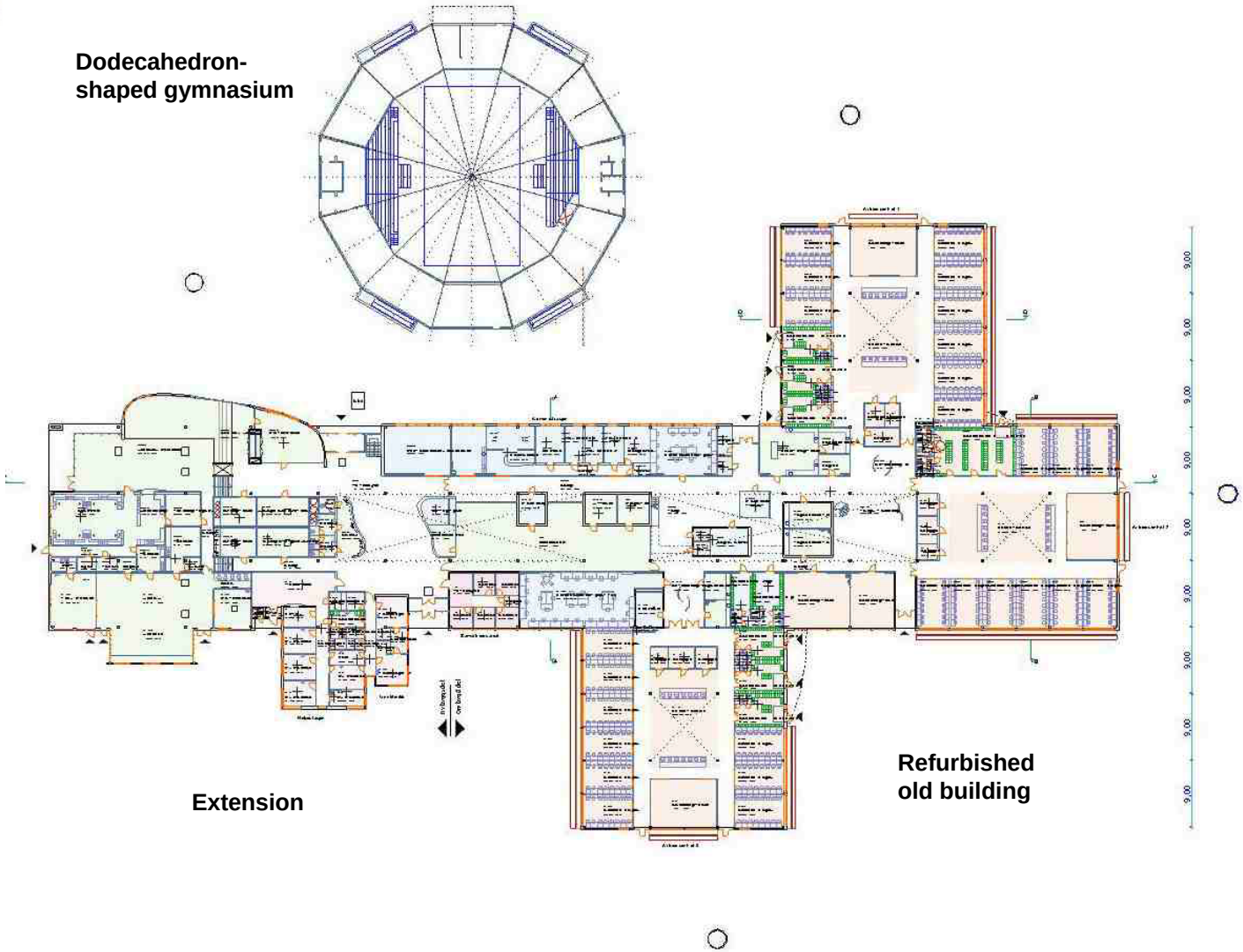
Ventilation
- Reduce electric energy for ventilation fans by using natural driving forces – buoyancy and wind
- Air rate regulated according to actual needs
- Heat recovery systems

Lighting
- Active use of daylight
- Automatic control of artificial light

BEMS
- Optional automatic or manual control of all functions
- Energy meters for monitoring total consumption
- Energy monitoring of different sections of the building

Energy saving
- Reduce energy consumption by 50% or better.

Dodecahedron-shaped gymnasium

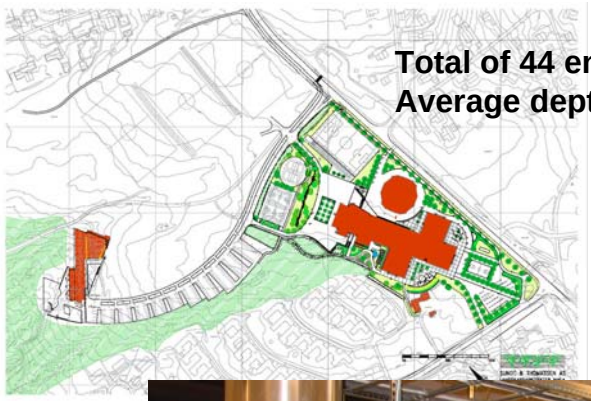


Extension

Refurbished old building


Before


After



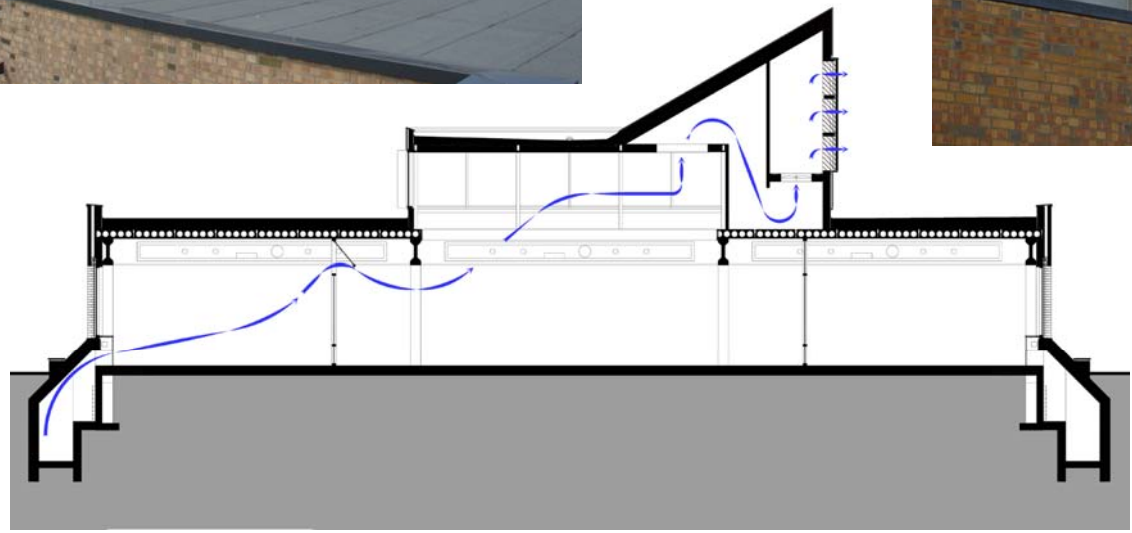
Total of 44 energy wells
Average depth 150 meters

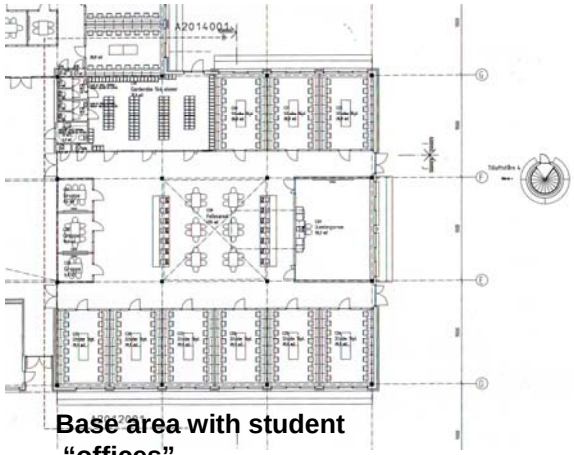
Geothermal heat pump

Utilizes renewable energy resources

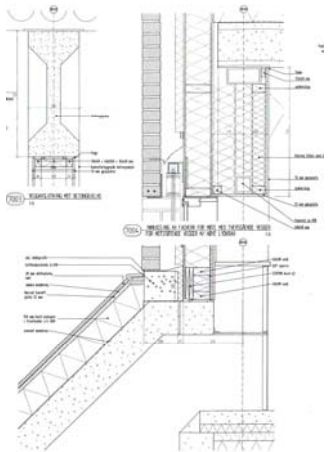
Produces hot water for space heating and domestic hot water

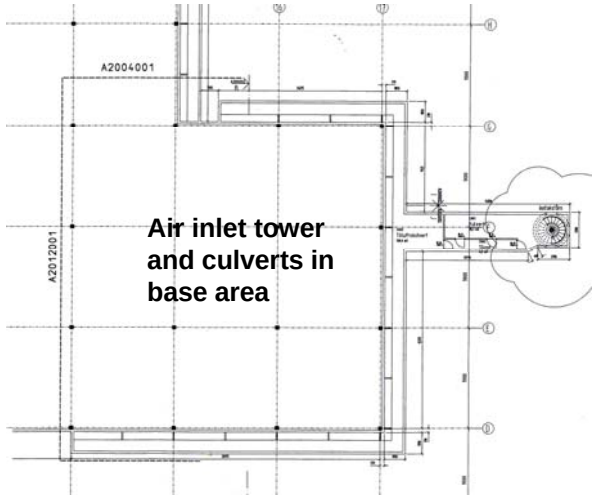
Natural/hybrid ventilation





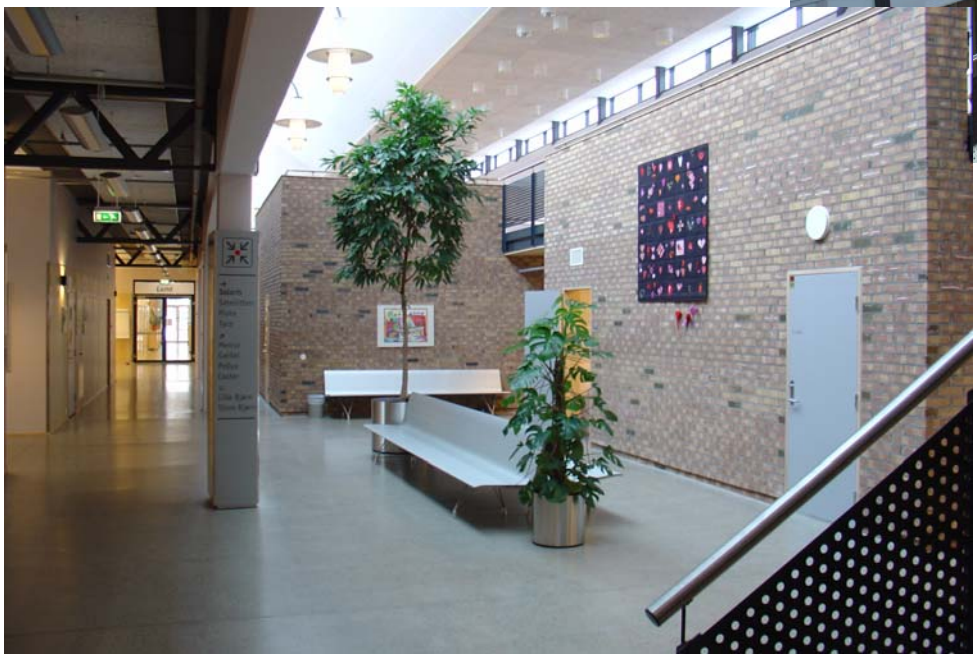
Base area with student "offices"



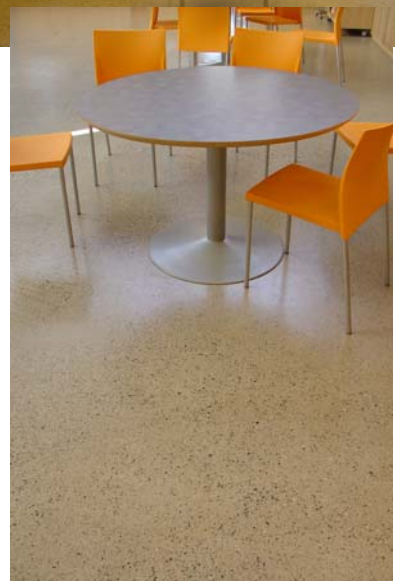


Air inlet tower and culverts in base area

Extensive use of building materials with high thermal capacity

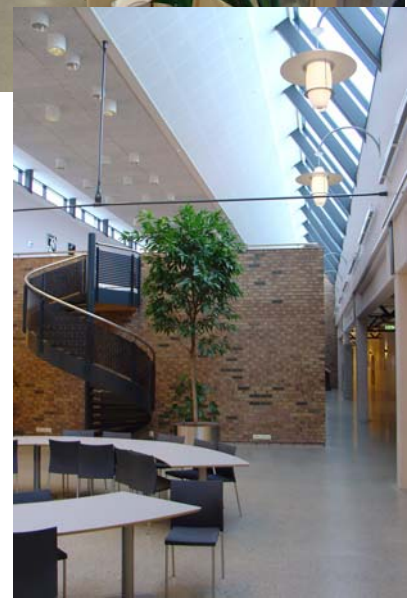


Active use of daylight



Artificial light is controlled by light- and motion sensors

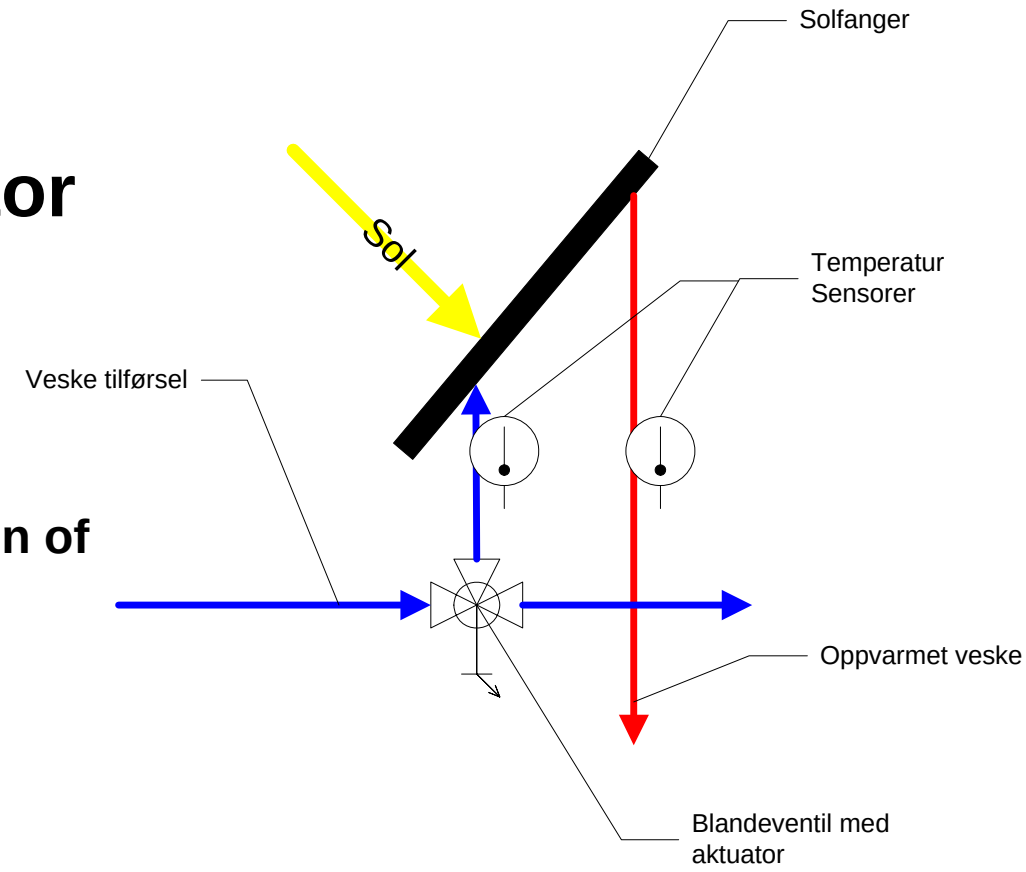
Large skylights provide daylight in central areas of the building

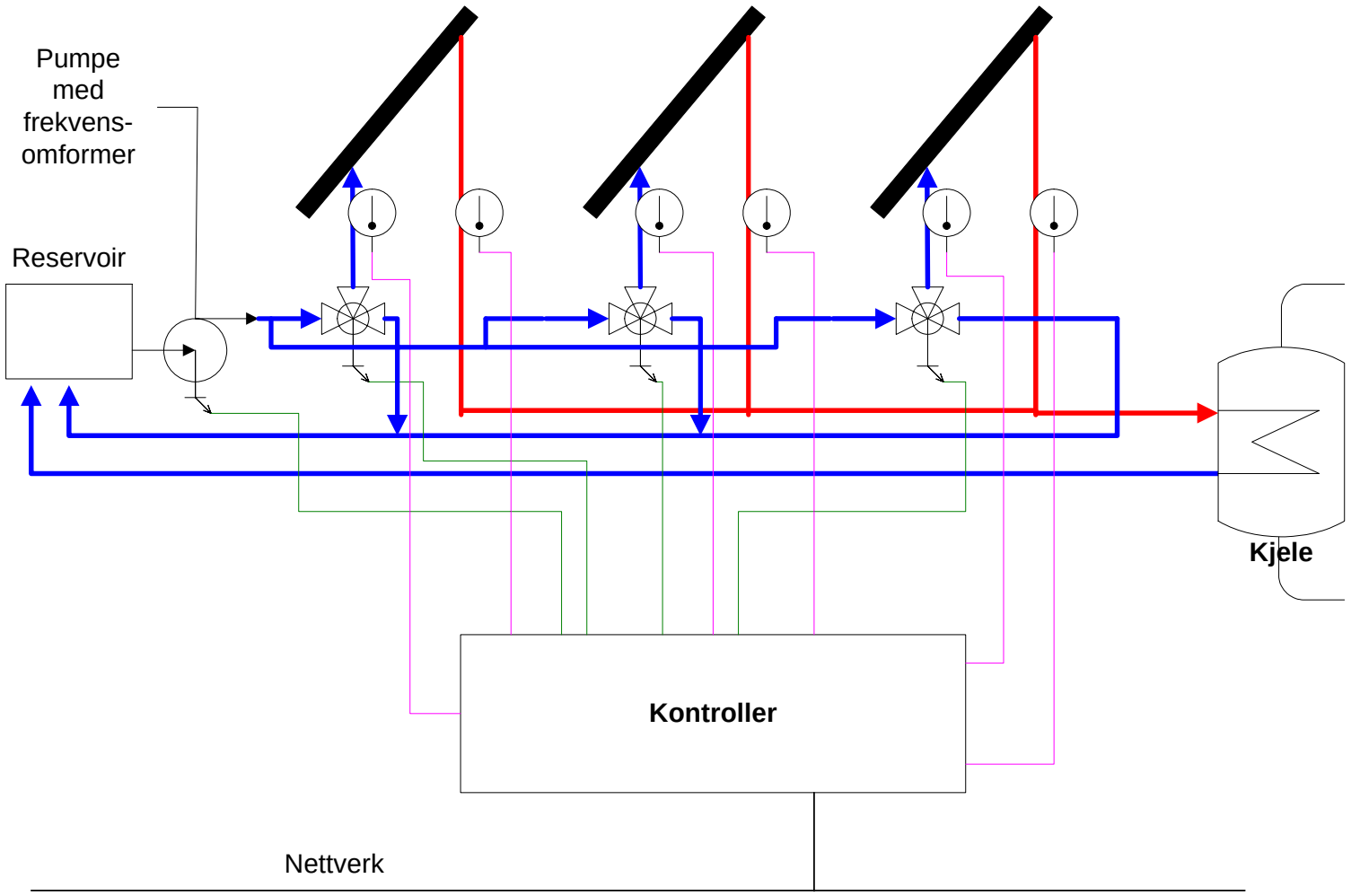


Jan Rolland
Asker Municipality

Solar collector

- **Automatic utilization of energy in collector**
- **Low cost**



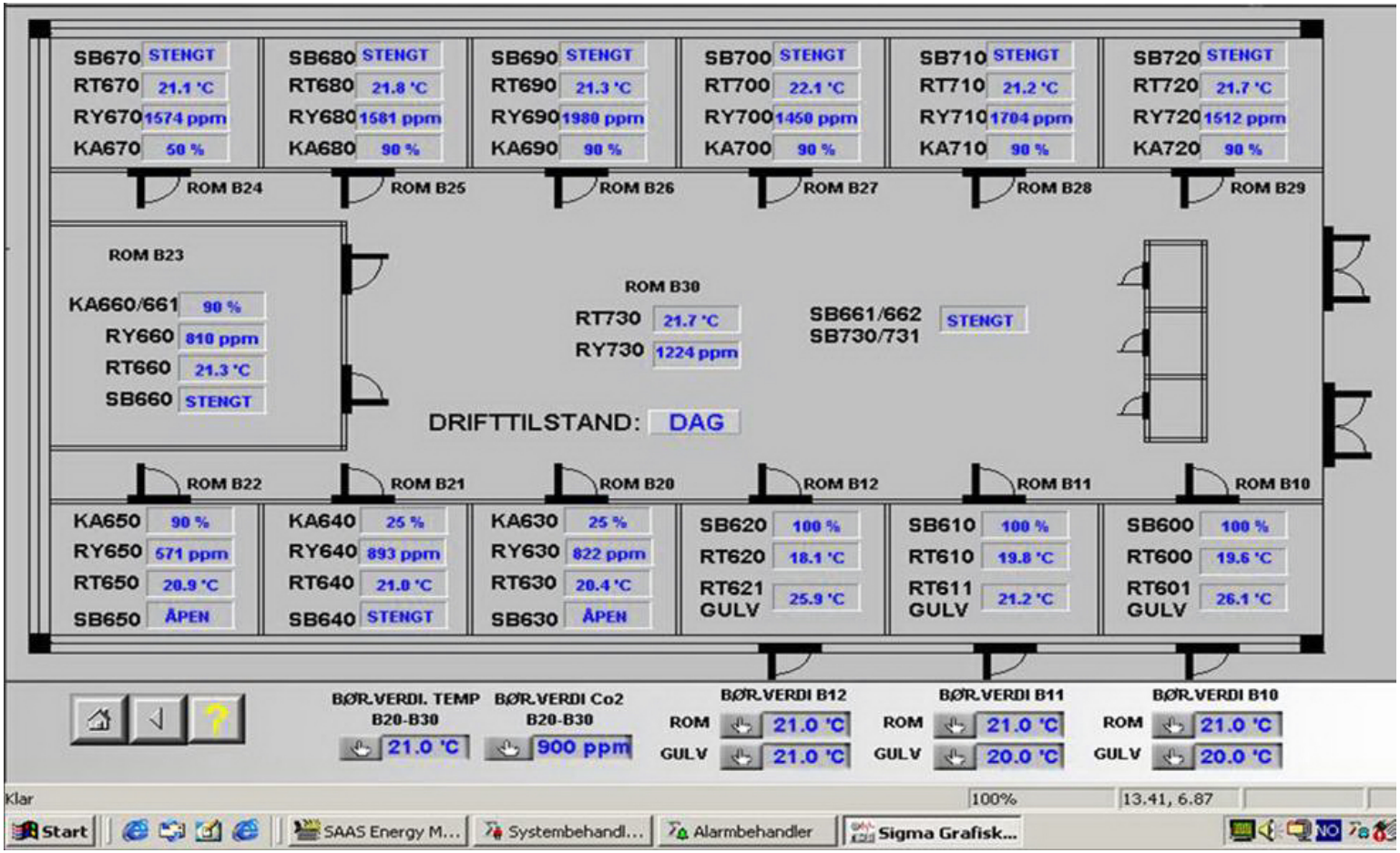

Pumpe
med
frekvens-
omformer
Reservoir
Kjele
Kontroller
Nettverk

- **Many alternatives to control the solar collectors**
- **Further studies, economic calculations and practical tests will decide which model gives the optimal solution**
- **Currant technology allows advanced control without high costs**

ACC windows

- Wooden window with a sash that may be turned 180 degrees in its frame
- Sealed glass unit with one solar absorbing glass and one glass with low emissive coating
- Increased solar gains during the heating season with the solar absorbing glass facing inwards
- Reduction of unwanted heat during the summer when the absorbing glass is facing outwards

BEMS


SB670 STENGT
RT670 21.1 °C
RY670 1574 ppm
KA670 50 %
SB680 STENGT
RT680 21.8 °C
RY680 1581 ppm
KA680 90 %
SB690 STENGT
RT690 21.3 °C
RY690 1980 ppm
KA690 90 %
SB700 STENGT
RT700 22.1 °C
RY700 1450 ppm
KA700 90 %
SB710 STENGT
RT710 21.2 °C
RY710 1704 ppm
KA710 90 %
SB720 STENGT
RT720 21.7 °C
RY720 1512 ppm
KA720 90 %
ROM B24
ROM B25
ROM B26
ROM B27
ROM B28
ROM B29
ROM B23
KA660/661 90 %
RY660 810 ppm
RT660 21.3 °C
SB660 STENGT
ROM B30
RT730 21.7 °C
RY730 1224 ppm
SB661/662
SB730/731 STENGT
DRIFTTILSTAND: DAG
ROM B22
ROM B21
ROM B20
ROM B12
ROM B11
ROM B10
KA650 90 %
RY650 571 ppm
RT650 20.9 °C
SB650 ÅPEN
KA640 25 %
RY640 893 ppm
RT640 21.0 °C
SB640 STENGT
KA630 25 %
RY630 822 ppm
RT630 20.4 °C
SB630 ÅPEN
SB620 100 %
RT620 18.1 °C
RT621 GULV 25.9 °C
SB610 100 %
RT610 19.8 °C
RT611 GULV 21.2 °C
SB600 100 %
RT600 19.6 °C
RT601 GULV 26.1 °C
BØR.VERDI. TEMP B20-B30 21.0 °C
BØR.VERDI Co2 B20-B30 900 ppm
BØR.VERDI B12 ROM 21.0 °C GULV 21.0 °C
BØR.VERDI B11 ROM 21.0 °C GULV 20.0 °C
BØR.VERDI B10 ROM 21.0 °C GULV 20.0 °C
Klar
100%
13.41, 6.87
Start
SAAS Energy M...
Systembehandl...
Alarmbehandler
Sigma Grafisk...
NO

Thank you for your attention!