

Two-family house in Schürmatt, Stansstad CH

PROJECT SUMMARY

Comprehensive renovation of building, not renovated since built in 1962, including: energy, sound acoustics, kitchens+baths and balconies.

SPECIAL FEATURES

Swiss Minergie-P Standard (stricter than "Passive House")

ARCHITECT

BARBOS, CH-6370 Stans

OWNER

Gabriela Rohrer & Leo Odermatt



IEA – SHC Task 37

Advanced Housing Renovation with Solar & Conservation

Before



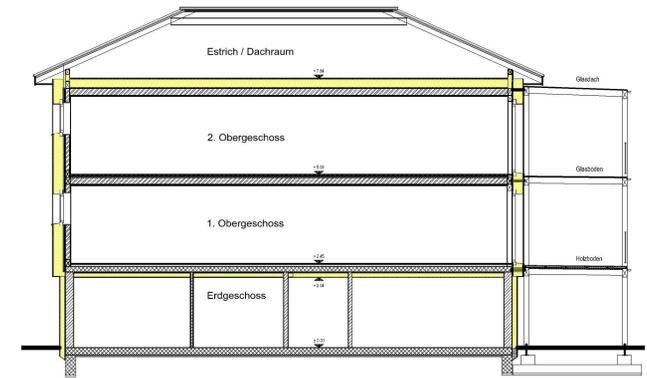
After

BACKGROUND

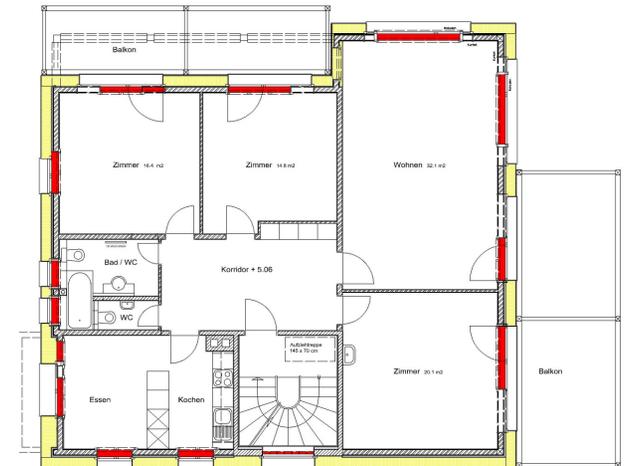
Building never renovated since built in 1962, tenants had moved out so vacant. Owners decided to bring the house to highest energy standard, use renewable energy, improve daylighting and better acoustically isolate the apartments.

SUMMARY OF THE RENOVATION

- Thermal breaks eliminated, i.e. new balconies supported on posts.
- Wall openings for windows on SE and SW facades increased to admit more light
- Walls including basement insulated on exterior
- Attic floor and basement ceiling insulated
- Apartment acoustically isolated
- Oil heating replaced by wood pellet furnace and new heat distribution piping
- Solar collectors added



Section



First floor plan



CONSTRUCTION

Roof floor construction *U-value: 0.11 W/(m²·K)*

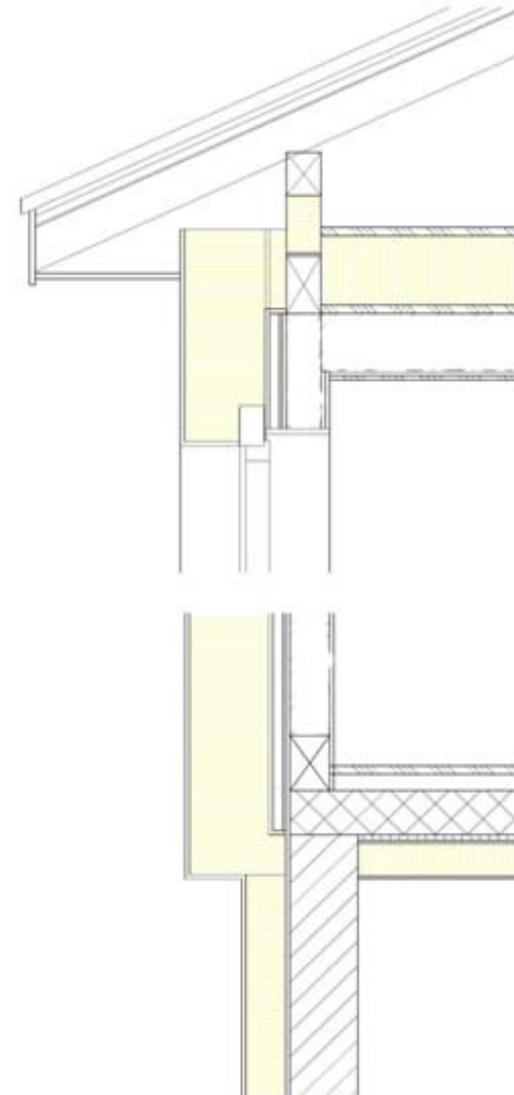
Wooden floor	20 mm
Mineral wool insulation (Flumroc Para)	240 mm
Weather barrier (Tyvek)	x mm
Wooden spacers	25 mm
Wooden beams	200 mm
Plaster ceiling	15 mm
Total	500 mm

Wall construction *U-value: 0.11 W/(m²·K)*

(interior to exterior)	
Wooden interior panelling	15 mm
Wooden framing	140 mm
Wooden sheathing + Perfektaplatte	50 mm
Existing exterior stucco	15 mm
Plywood (3-layer)	27 mm
Mineral wool (Flumroc Compact)	280 mm
Mineral Stucco	10 mm
Total	537 mm

Basement ceiling *U-value: 0.15 W/(m²·K)*

(top down)	
Wooden parkett	10 mm
Cement leveling mortar bed	45 mm
Shredded cork separating layer	10 mm
Concrete slab	150 mm
Styropor insulation + plaster	30 mm
Styropor Hi-Compact + plaster	125 mm
Total	370 mm





Acoustical insulation:

New suspended ceiling with acoustical insulation
New sound deadening floor

Wall openings

Enlarged with new structural reinforcing to accommodate larger windows to the south-east and south-west.

Window thermal properties (W/m²K):

- U_{glass} 0.50

- g 0.48

- U_{window} 0.77

Sirus Multifunction Window System

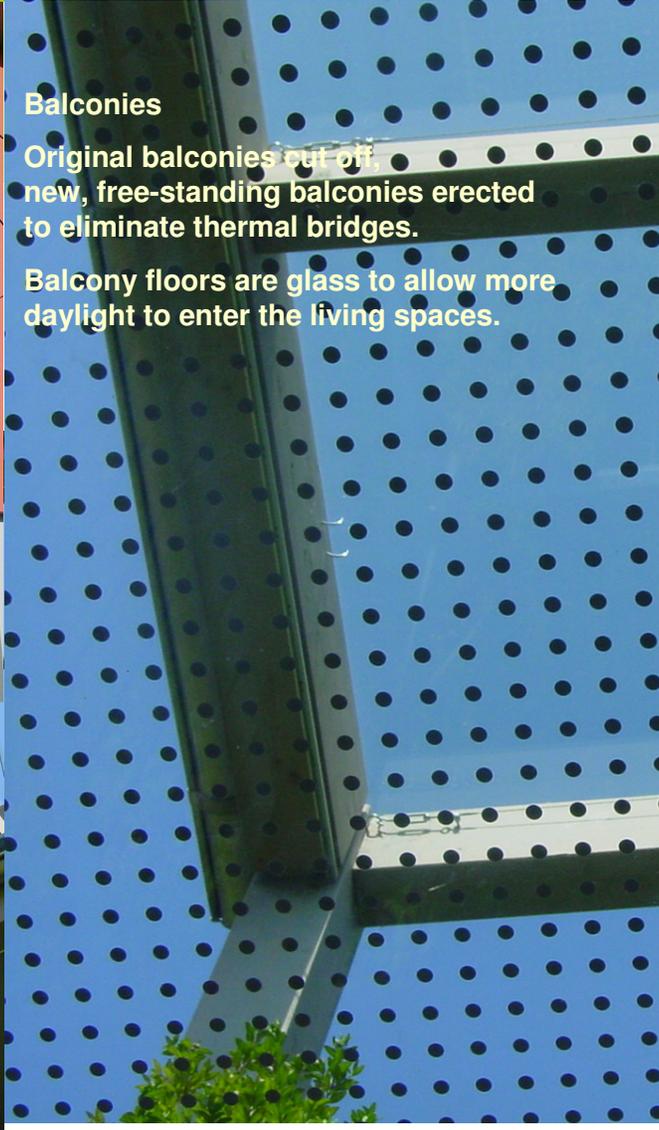




Balconies

Original balconies cut off,
new, free-standing balconies erected
to eliminate thermal bridges.

Balcony floors are glass to allow more
daylight to enter the living spaces.





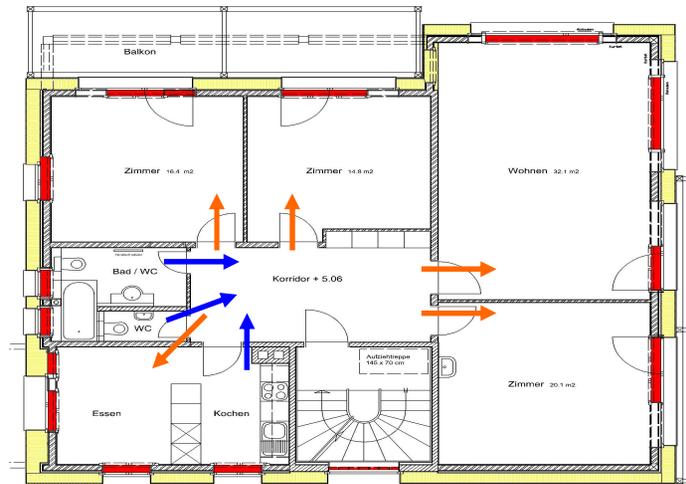
Ventilation / air tightness

Mechanical ventilaton with heat exchanger in attic.
50 W power by 150 m³/h and 50 Pa
(Hoval Homeven RS 250)

Air supply and return via ducts in corridors and
in roof, where ducts wrapped with 50 mm insulation.



Building envelope tightend against air leakage
to achieve $n_{50} = 1.0$





Summary of U-values W/(m²·K)

	Before	After
Attic floor	0.55	0.11
Walls	0.65	0.11
Basement ceiling	0.80	0.15
Windows U _{total}	2.4	0.77

BUILDING SERVICES

- Central ventilation system with heat recovery
- Central wood pellet stove (8 kW)
(pellets in space of former oil tanks)

RENEWABLE ENERGY USE

- 8 m² roof-integrated solar collectors coupled
- 750 l storage tank

ENERGY PERFORMANCE

Space + water heating (primary energy)*

Before: 160 kWh/m²

After: 20 kWh/m²

Reduction: 88%



INFORMATION SOURCE

BARBOS

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