

Apartment Building Birmensdorferstr., Zürich, CH

(IN PROGRESS)

PROJECT SUMMARY

New façade to the street
New ground floor architecture
Roof-integrated PV panels and
solar thermal collectors

SPECIAL FEATURES

Sustainable living downtown
"Zero energy renovation"

ARCHITECT

kämpfen für architektur,
www.kaempfen.com

OWNER

Thomas and Pierre Ledermann,
Zürich-Lausanne



IEA – SHC Task 37

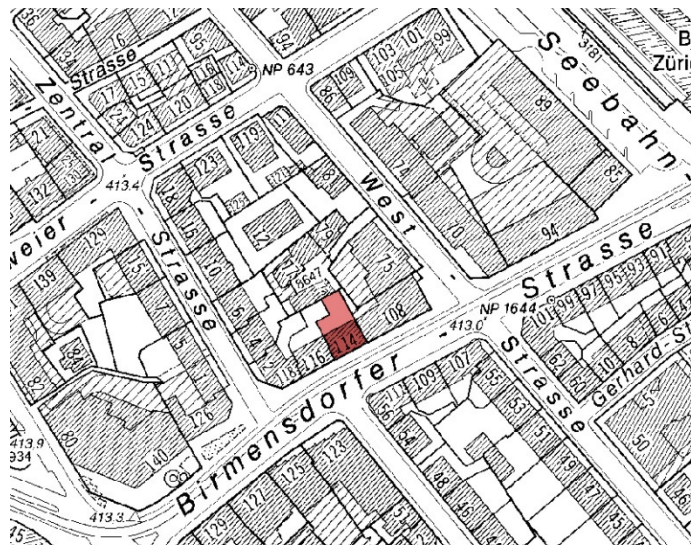
Advanced Housing Renovation with Solar & Conservation

Birmensdorferstr., views from top balcony

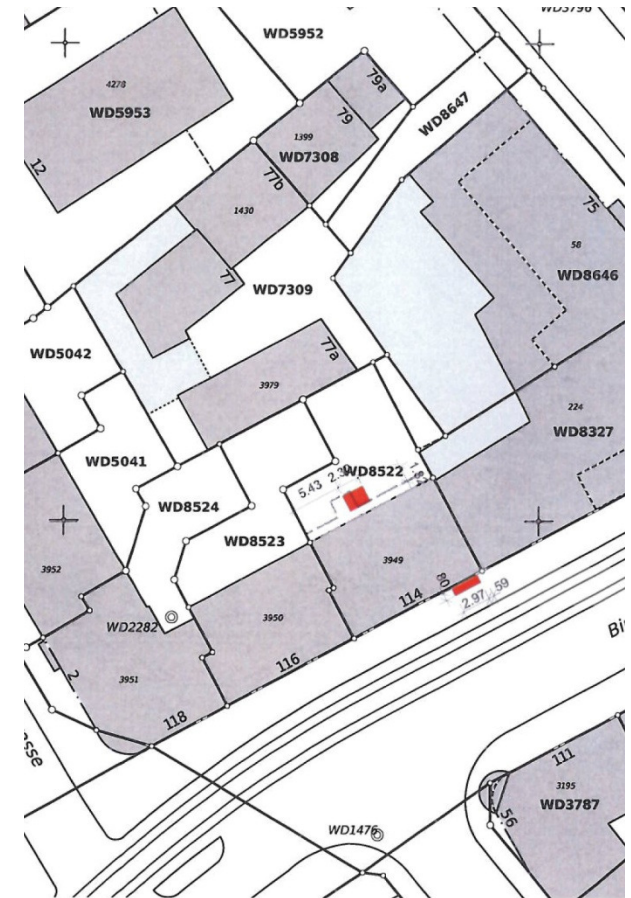


BACKGROUND: DOWNTOWN LIVING

The apartment building at Birmensdorferstrasse 114 in District 3 lies near the city center of Zürich. It was built in 1938 as part of a corner house on a compact street-front. Its central location is very attractive, except it is situated on a street with heavy traffic and noise; this will be minimized when the city reroutes the traffic.



Zürich-Wiedikon, Birmensdorferstrasse 114



Cadastral survey

Before: street front

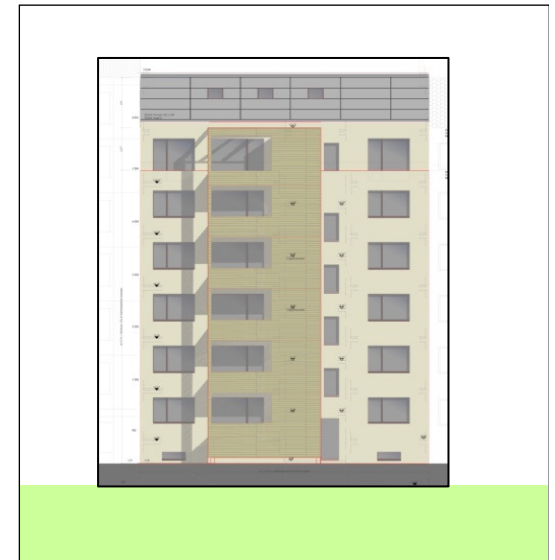


Before: courtyard facade

BEFORE RENOVATION

- Uninsulated plastered masonry façades, broken balcony slabs and plumbing needing replacement
- Apartment entries non-compliant to today's fire codes
- Original wooden parquet floors well-preserved, but ceiling construction transmits of footstep noise
- Floor plans well-organized but too small for the contemporary apartment market
 - 3-rooms totaling 73 m²
 - 2-rooms totaling 58 m²Kitchens and baths need renovation.
- Two small, ground floor flats have blinds always closed because at street noise and lack of privacy intolerable

After: South façade to the street



After: courtyard façade

Old living room



SUMMARY OF THE RENOVATION

- Architectural concept: The appearance of the street-front façade is preserved to maintain the compactness of the block. The composition of the façade, as well as the choice of materials is derived from the original historical building.
- A new architectural accent is achieved by installing bow windows and large display windows on the ground floor.
- As a result of the added insulation, the windows are deeper. On the courtyard side the new façade has been projected out one meter beyond the original façade to win additional living space. This façade is prefabricated wooden construction.
- A new window rhythm on the courtyard side is created by the projecting volumes in wooden construction for the lift and balconies. The Larch wooden facing creates an attractive atmosphere in the courtyard.

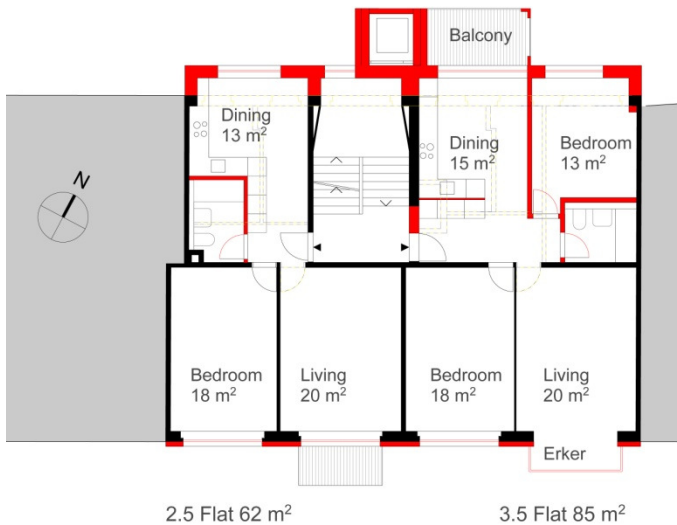
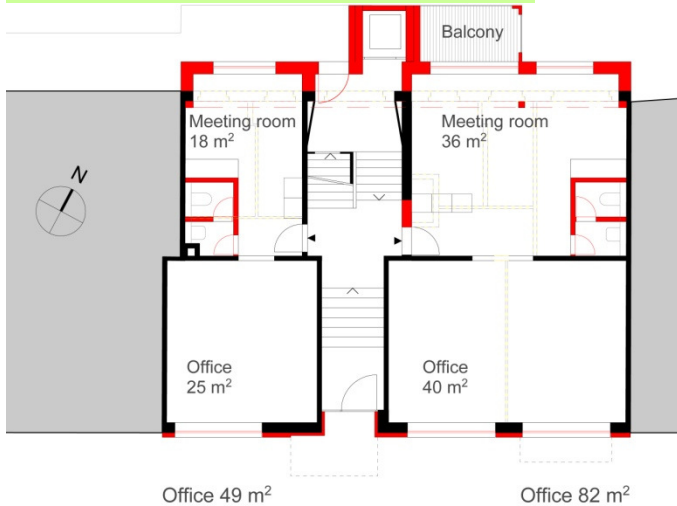
New Living room



Old kitchen



New Kitchen

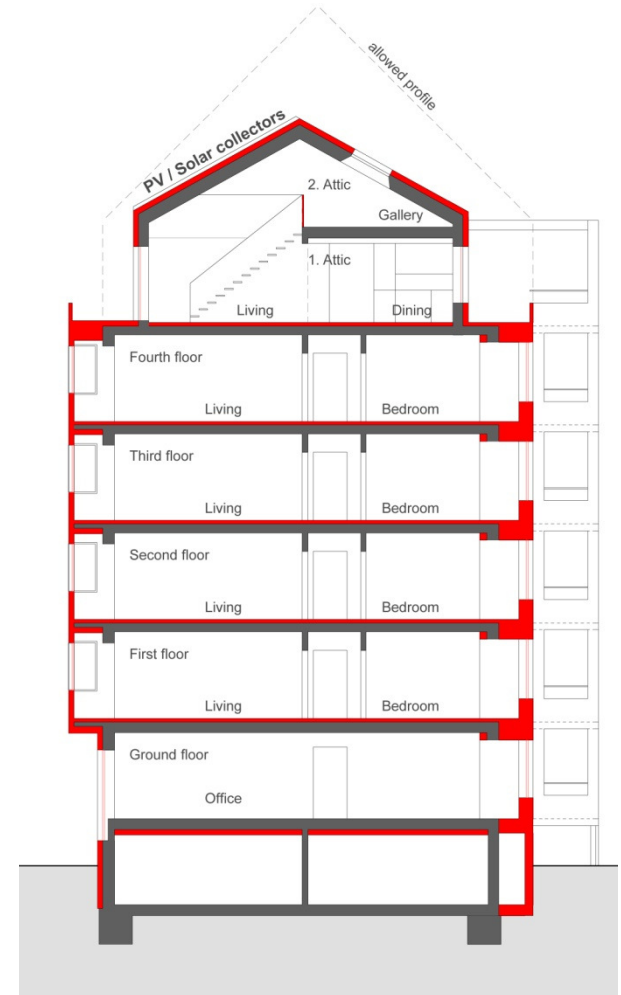


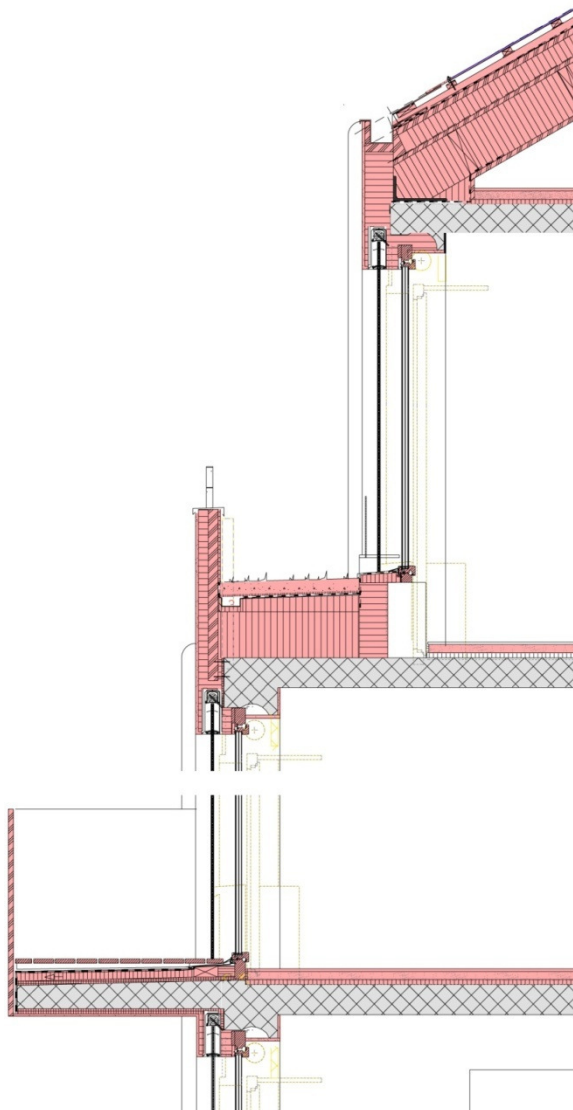
PROJECT GOALS

- Upgrade the building to newest energy standards
- Adapt apartments to contemporary market demands
- Make the ground floor more functional
- Add an attic apartment
- Add a lift

SURFACE INCREASE/ ADDITIONAL VALUE

- The chance to renovate an existing structure in this was only possible due to the increased rental income from the larger apartments which are 126% the size of the original units.
 - rentable area before renovation: 744 m²
 - rentable area after renovation: 939 m²
- Today, this 1938 building is like new, meeting a high energy standard. The CHF 3 million effort has paid off well. The government contributed CHF 135,000.





CONSTRUCTION

Wall south

U-value: 0.20 W/(m²·K)

(interior to exterior)

Interior plaster	20 mm
Bricks	340 mm
Exterior plaster	15 mm
Thermal insulation (Flumroc Compact)	140 mm
<u>Exterior insulation</u>	<u>15 mm</u>
Total	530 mm

Wall north

U-value: 0.11 W/(m²·K)

(interior to exterior)

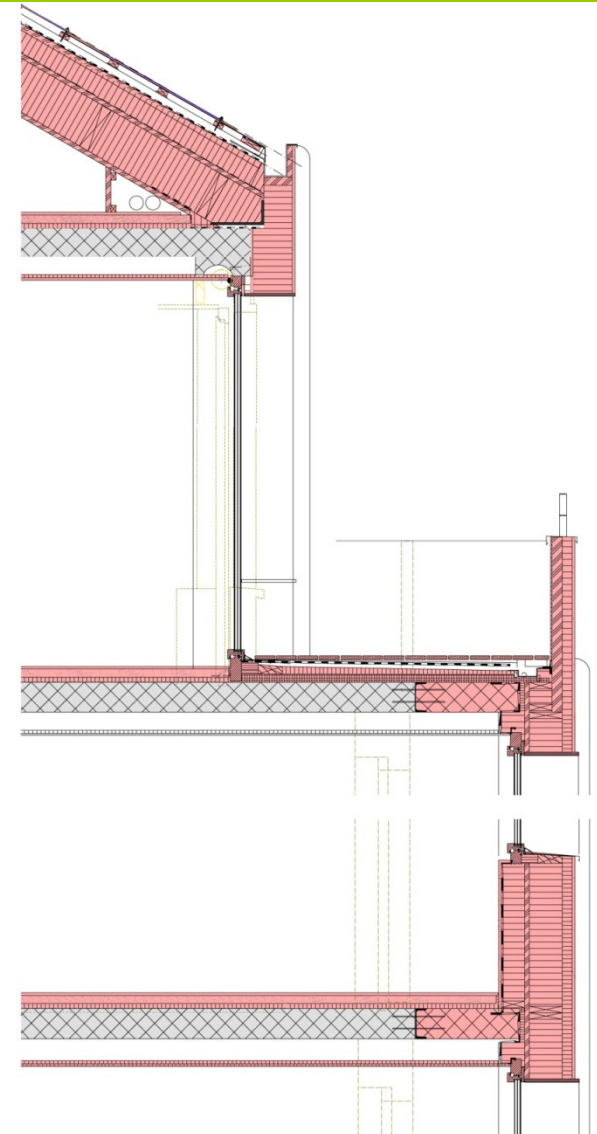
Fibre reinforced plasterboard	15 mm
Flumroc insulation + pillars	140 mm
Three-layer slab	27 mm
Saglan insulation + pillars	200 mm
Wood fibreboard (Diffutherm)	60 mm
<u>Exterior plaster</u>	<u>15 mm</u>
Total	457 mm

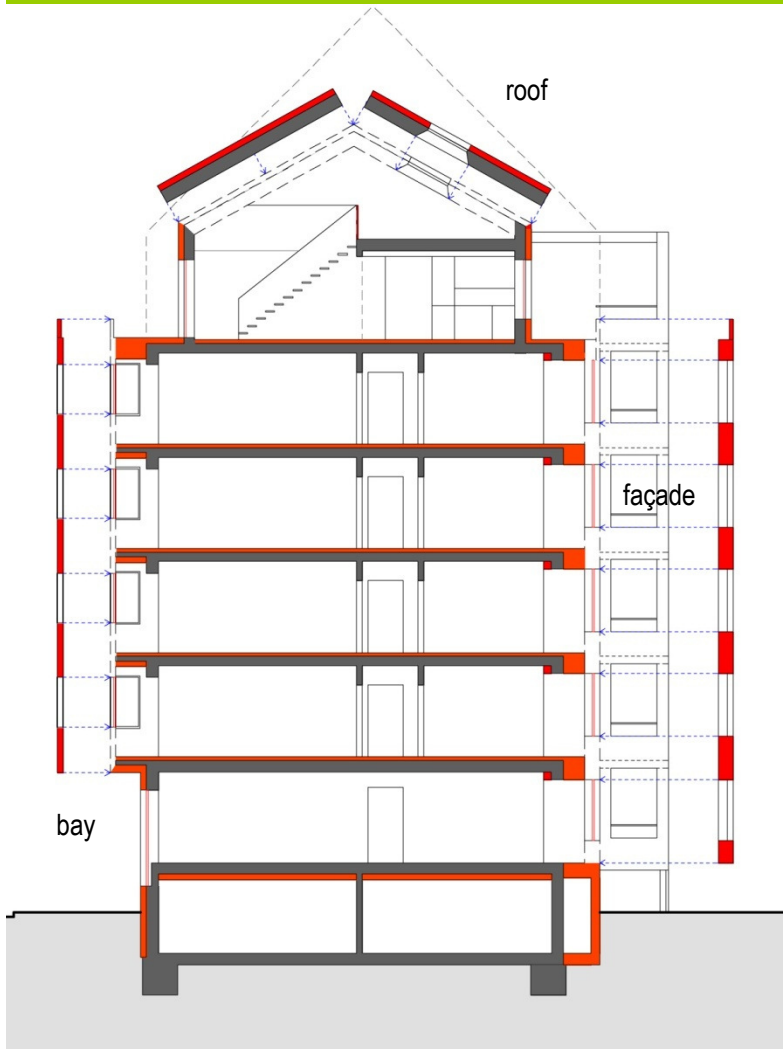
Roof

U-value: 0.09 W/(m²·K)

(interior to exterior)

Three-layer slab (visible)	27 mm
Thermal insulation with 60/280 rafters	280 mm
Nailed three-layer slab	27 mm
Thermal insulation with 60/120 rafters	120 mm
Woodboard / Roof membrane	35 mm
Counter lathing / Air space	60 mm
<u>Fibre cement (Eternit) roofing</u>	<u>10 mm</u>
Total	559 mm



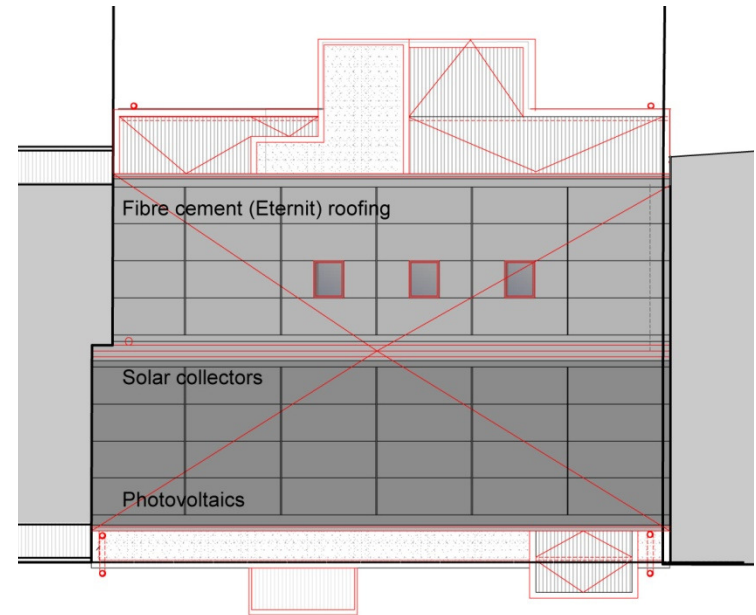


Section with prefabricated elements

PREFABRICATION

Wooden prefabrications:

- The north façade
- Bay windows
- The roof



Integrated PV, Collectors, Eternit System

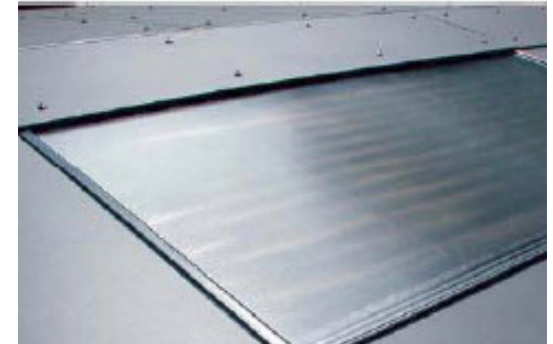
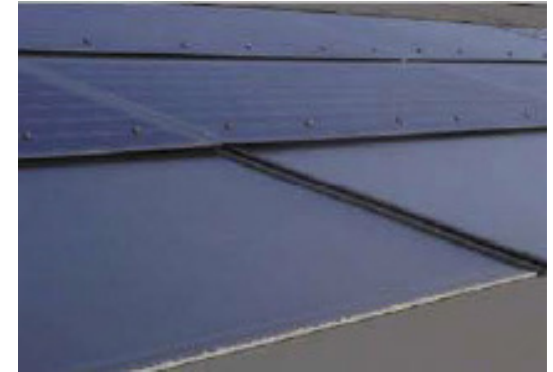
Because these well-insulated elements comprise more than half the building envelope, it was possible to meet the strict, Swiss Minergie-P Standard. The opaque elements were constructed in as large units as large as possible (height: 3 x 10 m) There are no windows, air ducts or electric conduits in the elements.

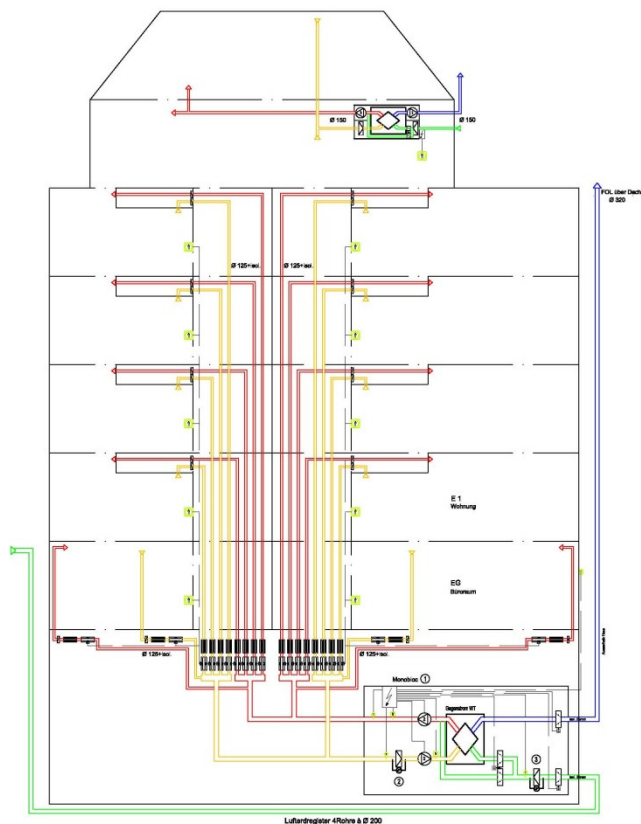
BUILDING SERVICES AND RENEWABLE ENERGY USE

Ground-source heat pumps are prohibited at this site, but ground water usage is allowed. Two alternatives were therefor possible: a air-water heat pump or a wood-pellet furnace. In the end, the decision was for a gas-fueled boiler complimented by thermal solar collectors.

30m² of PV panels and 25m² of solar collectors were integrated into the new roof construction. A 3000 liters tank provides thermal storage. The collector area is based on 1m² per person.

Fresh air is supplied to the apartments by a central ventilation system. The apartments are supplied by ducts running through a central shaft and then distributed laterally above a suspended ceiling to each room. The new penthouse unit has its own seperate ventilation system.





Minergie-P Haus, MFH Birmensdorferstr.114, Zürich		Datum: 3.11.08
Planforum Energie & Haustechnik GmbH	Prinzipschema Variante 1	gezeichnet: mf
	Kontrollierte Wohnungslüftung	Planungsphase: Ak
Nummer: 13 8401 100001 Tel. 043 215 00 00 Fax: 043 215 00 10		Revisiert: Revidiert: Mit: Plan-Nr.: 824-4001L

Ventilation system

Summary of U-values $W/(m^2 \cdot K)$

	Before	After
Basement ceiling	1.60	0.18
Roof construction	1.90	0.09
Wall construction (south)	1.07	0.20
Wall construction (north and bow windows)	1.07	0.11
Windows*	1.70	0.80

ENERGY PERFORMANCE

Space + water heating (primary energy)*

Before: 169 kW/m^2a

After: 18 kW/m^2a (Minergie-P Standard)

Reduction: 89%

INFORMATION SOURCES

Ventilation system: Planforum, Winterthur

Brochure authors

Nadja Grischott
Nadia Mastacchi