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"

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IEA – SHC Task 37
Advanced Housing Renovation with Solar & Conservation
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.
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 m²
  Kitchens and baths need renovation.
- Two small, ground floor flats have blinds always closed because at street noise and lack of privacy intolerable
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.
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
Exterior insulation 15 mm
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
Exterior plaster 15 mm
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
Fibre cement (Etermit) roofing 10 mm
Total 559 mm
PREFABRICATION

Wooden prefabrications:
- The north façade
- Bay windows
- The roof

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 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 separate ventilation system.
ENERGY PERFORMANCE

Space + water heating (primary energy)*
Before: 169 kW/m²a
After: 18 kW/m²a (Minergie-P Standard)
Reduction: 89%

INFORMATION SOURCES
Ventilation system: Planforum, Winterthur
Brochure authors
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Nadia Mastacchi