

Apartment building „Tevesstraße“ in Frankfurt am Main, DE

PROJECT SUMMARY

Renovation of two apartment buildings, built in the postwar period. Reduction of annual heat energy demand: 91 %. Almost complied with Passive House Standard

SPECIAL FEATURES

Ventilation appliance with heat recovery (efficiency >85%) in each apartment. Solar collectors

ARCHITECT

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OWNER

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IEA – SHC Task 37

Advanced Housing Renovation with Solar & Conservation

Source: International Energy Agency IEA, Solar Heating & Cooling Programme SHC www.iea-shc.org/tasks/index.htm

Before



After

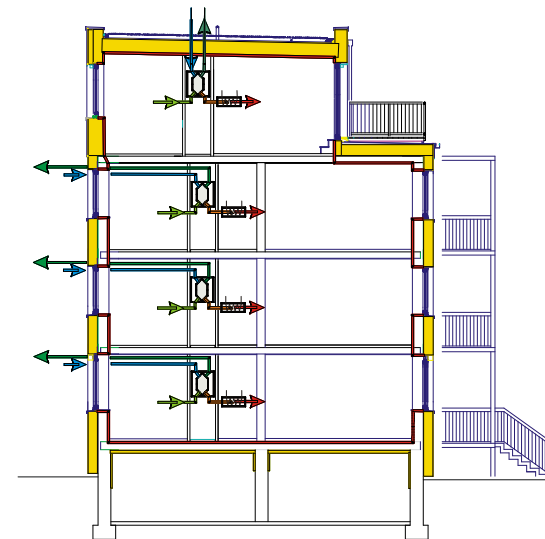
BACKGROUND

The buildings with a typical basic structure of postwar period were in bad order. At the complete renovation of the 60 apartments only products were used which are suitable to Passive House standard. The energetic improvement of the building equipment and the reduction of thermal bridges were further key aspects of the modernisation. The buildings are energetic balanced by the Passive House Planning Package (PHPP) and will be metrological analyzed for several years.

After renovation the apartment buildings almost complied to Passive House standard and achieved 17 kWh/(m²a) annual heat energy demand.

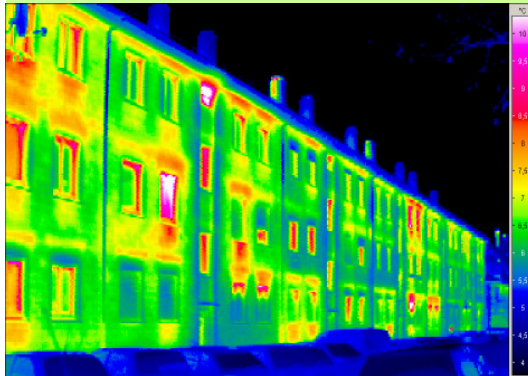
SUMMARY OF THE RENOVATION

- exterior insulation and finish system, 260 mm
- insulation of basement ceiling
- new attic floor, wooden light-weight construction, completely insulated
- passive house suitable windows (triple glazing)
- decentral ventilation appliances with heat recovery
- improving efficiency of the air tight layer
- efficient reduction of thermal bridges
- new electric and sanitary installation



Section

Before



After



CONSTRUCTION

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

MDF-board	20 mm
insulation / wood	400 mm
OSB-board	15 mm
<u>gypsum plaster board</u>	<u>20 mm</u>
Total	455 mm

Wall construction *U-value: 0.12 W/(m²·K)* (interior to exterior)

interior plaster	15 mm
cavity block (existing)	300 mm
exterior plaster (existing)	20 mm
expanded polystyrene	260 mm
<u>exterior plaster (new)</u>	<u>20 mm</u>
Total	615 mm

Basement ceiling *U-value: 0.17 W/(m²·K)* (top down)

timber flooring	20 mm
footstep sound insulation	10 mm
insulation	40 mm
Stahlsteindecke	180 mm
insulation	80 mm
<u>stopping</u>	<u>20 mm</u>
Total	350 mm





Light rooms by generous windows



ventilation appliance in the bathroom

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

	Before	After
Attic floor	1.6*	0.12**
Walls	1.3	0.12
Basement ceiling	2.2	0.18
Windows	2.9	0.85

• Ceiling to unheated attic floor

** new attic floor

BUILDING SERVICES

A ventilation appliance with heat recovery (efficiency >85%) is installed in each apartment. Domestic hot water will be prepared by solar collectors and the remaining demand on heat energy is covered by a gas-fueled condensing boiler.

RENEWABLE ENERGY USE

The roof areas are used by solar collectors.

ENERGY PERFORMANCE

Space + water heating (primary energy)*

Before: 328 kWh/m²

After: 37 kWh/m²

Reduction: 89%

*German Standard: KfW 40

INFORMATION SOURCES

Passive House Institute, Darmstadt, DE

www.passiv.de

faktor 10, Gesellschaft für Siedlungs- und Hochbauplanung mbH

www.faktor10.com

ABG Frankfurt Holding, Wohnungsbau- und Beteiligungsgesellschaft mbH

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