

Apartment Building Blaue Heimat, Heidelberg

PROJECT SUMMARY

Building under historical preservation protection, substantial renovation with redesign of floor plans, insulation of the building envelope, central heating system based on combined heat and power (CHP).

Reduction of primary energy: 84%

SPECIAL FEATURES

CHP, mechanical ventilation with heat recovery, PV (10kWp)

ARCHITECT

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ENERGY CONCEPT

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OWNER

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IEA SHC Task 37

Advanced Housing Renovation with Solar & Conservation



Before



After

BACKGROUND

Blaue Heimat is part of a residential quarter, which was built in two stages in 1927 and 1951. The section built in 1951 is comprised mainly of two-room apartments. Within the renovation project the main objectives were:

- Redesign of floor plans according to modern living standards and different types of apartments (2-4 room apartments)
- Reduction of the primary energy demand to under 40 kWh/m²a by insulation, new windows and new heat and ventilation systems

SUMMARY OF THE RENOVATION

- Redesign of floor plans
- Balconies
- Insulation of the façade (200 mm), the roof (280 mm) and the basement ceiling (160 mm)
- New windows (triple glazing)
- Central heating system with CHP, peak load boilers and water storage
- Semi-central mechanical ventilation system



Section



Ground floor



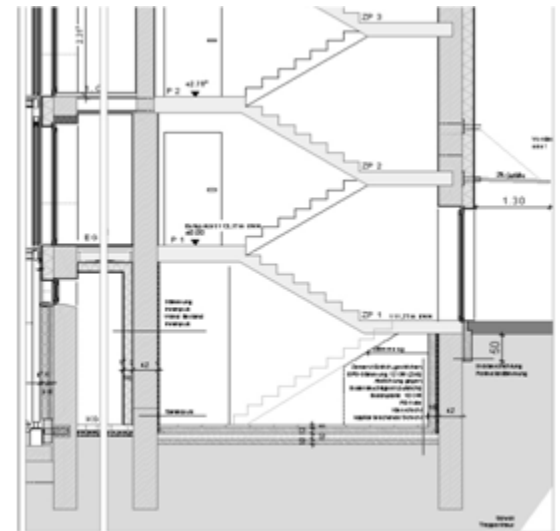
Air tightness in the attic

CONSTRUCTION

Roof construction	<i>U-value: 0.13 W/(m²·K)</i>
(top down)	
Metal roof	3 mm
Battens and counterbattens	48 mm
Roof sealing layer (vapour permeable)	
Wood boarding	24 mm
Mineral wool insulation	280 mm
Plasterboard	15 mm
<u>Vapour barrier</u>	
Total	~ 370 mm

Wall construction	<i>U-value: 0.15 W/(m²·K)</i>
(interior to exterior)	
Interior Plaster (existing)	20 mm
Clay brick (existing)	420 mm
Exterior plaster (existing)	20 mm
Mineral wool insulation	200 mm
<u>Exterior plaster</u>	20 mm
Total	680 mm

Basement ceiling	<i>U-value: 0.17 W/(m²·K)</i>
(top down)	
Parquet	19 mm
Screed (existing)	50 mm
Impact sound insulation	30 mm
Reinforced concrete slab (existing)	200 mm
<u>Mineral wool insulation</u>	160 mm
Total	~460 mm



Section through staircase



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

	Before	After
Roof	No data	0.13
Walls	No data	0.15
Basement ceiling	No data	0.17
Windows*	No data	1.20

BUILDING SERVICES

Heating supply is provided by a CHP (50 kWel/ 80 kWth), combined with two peak load boilers (each 92 kW) and three water storages (each 1000 litres). The supply system is based on natural gas. Distribution heat pipes are strongly insulated (200 %). A mechanical ventilation system with heat recovery (> 85 %) reduces the energy demand additionally. Due to the renovation, heat generation is sufficient to supply both adjoined buildings.

RENEWABLE ENERGY USE

No renewable energy use.

ENERGY PERFORMANCE (PLANING)

Space + water heating (primary energy)*

Before: 270 kWh/m²

After: 34 kWh/m²

Reduction: 84 %

*German Standard: KfW 40

INFORMATION SOURCES

dena, Deutsche Energie- Agentur

www.neh-im-bestand.de

GGH- Heidelberg

www.ggh-heidelberg.de

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dena, German Energy Agency (building)

BMWi, Federal Ministry of Economics and Technology (analysis)

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