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)

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IEA SHC Task 37 Advanced Housing Renovation with Solar & Conservation



After

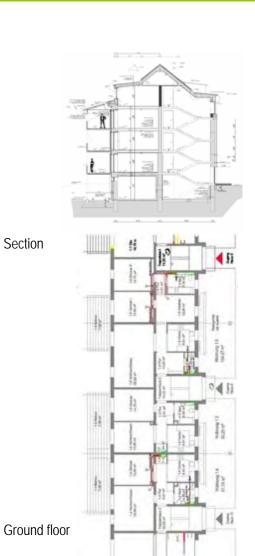
BACKGROUND

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

Air tightness in the attic

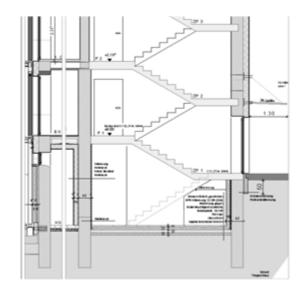
CONSTRUCTION

Roof construction	U-value: 0.1	3 W/(m².K)
(top down)		
Metal roof		3 mm
Battens and counterbattens		48 mm
Roof sealing layer (vapou	r permeable)	
Wood boarding		24 mm
Mineral wool insulation		280 mm
Plasterboard		15 mm
Vapour barrier		
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
Exterior plaster	20 mm
Total	680 mm

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





Section through staircase



Summary of U-values W/(m²·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 <u>www.neh-im-bestand.de</u> GGH- Heidelberg <u>www.qqh-heidelberg.de</u>

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