**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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**OWNER**
GGH - Heidelberg GmbH

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**Apartment Building Blaue Heimat, Heidelberg**

IEA SHC Task 37
Advanced Housing Renovation with Solar & Conservation
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
### Roof construction

*(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
- Vapour barrier
- **Total**: ~370 mm

### Wall construction

*(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

*(top down)*

- Parquet: 19 mm
- Screed (existing): 50 mm
- Impact sound insulation: 30 mm
- Reinforced concrete slab (existing): 200 mm
- Mineral wool insulation: 160 mm
- **Total**: ~460 mm

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**CONSTRUCTION**

- **U-value**: 0.13 W/(m²·K)
- **U-value**: 0.15 W/(m²·K)
- **U-value**: 0.17 W/(m²·K)
### Summary of U-values W/(m²·K)

<table>
<thead>
<tr>
<th></th>
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<th>After</th>
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<tbody>
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<tr>
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<tr>
<td>Basement ceiling</td>
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</tr>
<tr>
<td>Windows</td>
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<td>1.20</td>
</tr>
</tbody>
</table>

### 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

### RESEARCH FUNDED BY

dena, German Energy Agency (building)
BMWi, Federal Ministry of Economics and Technology (analysis)

### Brochure authors

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### 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.