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
Johannes Gerstner

ENERGY CONCEPT
solares bauen GmbH

OWNER
GGH - Heidelberg GmbH

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
CONSTRUCTION

Roof construction \hspace{1em} U-value: 0.13 W/(m²·K)
(top down)
Metal roof \hspace{1em} 3 mm
Battens and counterbattens \hspace{1em} 48 mm
Roof sealing layer (vapour permeable)
Wood boarding \hspace{1em} 24 mm
Mineral wool insulation \hspace{1em} 280 mm
Plasterboard \hspace{1em} 15 mm
Vapour barrier
Total \hspace{1em} ~ 370 mm

Wall construction \hspace{1em} U-value: 0.15 W/(m²·K)
(interior to exterior)
Interior Plaster (existing) \hspace{1em} 20 mm
Clay brick (existing) \hspace{1em} 420 mm
Exterior plaster (existing) \hspace{1em} 20 mm
Mineral wool insulation \hspace{1em} 200 mm
Exterior plaster \hspace{1em} 20 mm
Total \hspace{1em} 680 mm

Basement ceiling \hspace{1em} U-value: 0.17 W/(m²·K)
(top down)
Parquet \hspace{1em} 19 mm
Screed (existing) \hspace{1em} 50 mm
Impact sound insulation \hspace{1em} 30 mm
Reinforced concrete slab (existing) \hspace{1em} 200 mm
Mineral wool insulation \hspace{1em} 160 mm
Total \hspace{1em} ~460 mm

Air tightness in the attic

Section through staircase
Summary of U-values W/(m²·K)

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof</td>
<td>No data</td>
<td>0.13</td>
</tr>
<tr>
<td>Walls</td>
<td>No data</td>
<td>0.15</td>
</tr>
<tr>
<td>Basement ceiling</td>
<td>No data</td>
<td>0.17</td>
</tr>
<tr>
<td>Windows*</td>
<td>No data</td>
<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**

Florian Kagerer
Sebastian Herkel