

## PROJECT SUMMARY

Two similar buildings with different ventilation systems:

1st: Mechanical ventilation with heat recovery – 60 kWh/m<sup>2</sup>a heat demand

2nd: Exhaust air ventilation  
– 65 kWh/m<sup>2</sup>a heat demand

## SPECIAL FEATURES

Solar collector, reduction of primary energy: 87 % (calculation)

## ARCHITECT

B. Thoma – G. Henninger – Thoma

## HVAC ENGINEER

Ingenieurbüro Lenz

## ENERGY CONCEPT

Stahl+Weiß, Büro für  
Sonnenenergie

## OWNER

Freiburger Stadtbau GmbH

# Apartment Building Rislerstrasse, Freiburg



IEA – SHC Task 37

Advanced Housing Renovation with Solar & Conservation



Before



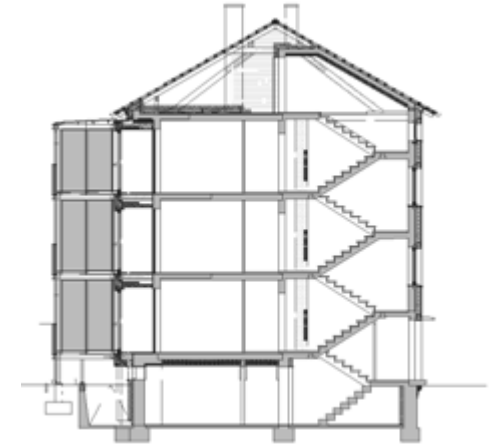
After

## BACKGROUND

Both apartment buildings were built in 1961 and are typical examples of similar housing projects of the 50s and 60s. Renovation was needed because the buildings' floor plans, heating systems and thermal properties were timeworn and obsolete. The owner Freiburger Stadtbau has many similar buildings and plans to use this renovation as an example for future renovation projects.

## SUMMARY OF THE RENOVATION

- Insulation of the façade (180 mm), the attic floor (260 mm) and the basement ceiling (200 mm)
- New windows (double glazing)
- Central heating system
- Possible connection to district heating system (future)
- Solar supported domestic hot water
- Enlarged balconies
- Expandability of kitchen and bath in case of new occupants



Section



Ground floor



Views of new balconies and entry

## CONSTRUCTION

### Floor construction *U-value: 0.14 W/(m<sup>2</sup>·K)*

(top down)

Mineral wool insulation	260 mm
screed (existing)	50 mm
<u>Reinforced concrete slab (existing)</u>	<u>200 mm</u>
Total	510 mm

### Wall construction *U-value: 0.15 W/(m<sup>2</sup>·K)*

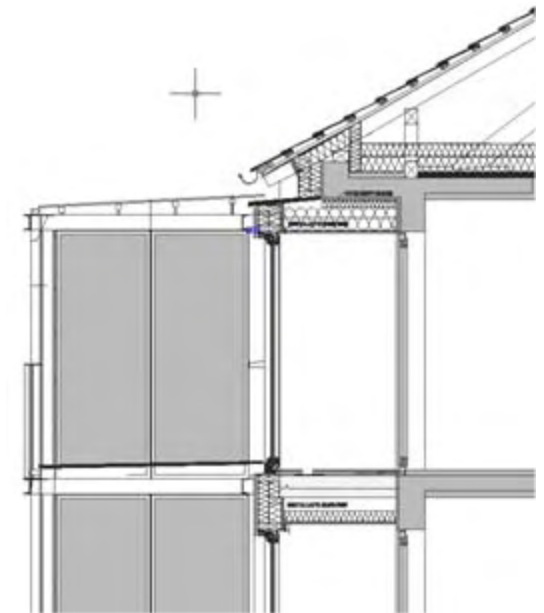
(interior to exterior)

Interior Plaster (existing)	20 mm
Clay brick (existing)	300 mm
Exterior plaster (existing)	20 mm
Mineral wool insulation	180 mm
<u>Exterior plaster</u>	<u>20 mm</u>
Total	540 mm

### Basement ceiling *U-value: 0.17 W/(m<sup>2</sup>·K)*

(top down)

Screed (existing)	5 mm
Reinforced concrete slab (existing)	200 mm
<u>Mineral wool insulation</u>	<u>200 mm</u>
Total	450 mm



Section through balcony and facade



### Summary of U-values W/(m<sup>2</sup>·K)

	Before	After
Attic floor	1.54	0.14
Walls	1.32	0.15
Basement ceiling	1.50	0.17
Windows*	~2.10	0.80

### BUILDING SERVICES

The existing single stoves in the buildings' apartments were replaced by central heating systems in the attics. Condensing boilers with 60kW are used for heating and hot water. In one building the ventilation system is combined with heat recovery. The second building has only a simple exhaust ventilation system with defined openings in the façades and windows. The heating systems in both buildings are supported by solar collectors and connection to a future district heating system is planned.

### RENEWABLE ENERGY USE

Each building has a solar collector, 24m<sup>2</sup> and 29m<sup>2</sup> respectively, installed on its roof and a 750 litre hot water storage tank.

### ENERGY PERFORMANCE (DESIGN)

Space + water heating (primary energy)\*

Rislerstrasse 1-5 (with heat recovery):

Before: 292 kWh/m<sup>2</sup>

After: 39 kWh/m<sup>2</sup>

Reduction: 87 %

\*German Standard: KfW 40

Rislerstrasse 7-13 (without heat recovery):

Before: 288 kWh/m<sup>2</sup>

After: 59 kWh/m<sup>2</sup>

Reduction: 80 %

\*German Standard: KfW 60

### INFORMATION SOURCES

dena, Deutsche Energie- Agentur

[www.neh-im-bestand.de](http://www.neh-im-bestand.de)

### RESEARCH FUNDED BY

dena, German Energy Agency (building)

BMWi, Federal Ministry of Economics and

Technology (analysis)

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