

## Big Heimbau (Germany)

**50% energy saving for heating & DHW**

### Project data

Location, address:	Franz Schubert Hof 20 + Mozartsstrasse 31, Engelsby,
Region:	Flensburg, Germany
Surroundings:	Urban zone
Climate:	Continental and cold
Heating degree days:	3302
Year of construction:	1964
Year of renovation:	2002
Typology:	Apartment building
No of dwellings:	80 – 2 towers
Total floor area:	5 700 m <sup>2</sup>
Owner:	BIG Heimbau AG, 24119 Kiel-Kronshagen, Germany
Renovation design team:	S&I Architects A/S, 5000 Odense C., Denmark
Realization team:	Esbensen Consulting Engineers A/S, 1620 Copenhagen V, Denmark
Costs of energy saving measures:	960 000 € (excl VAT)
Renovation financed by:	The owner – tenants - subsidies

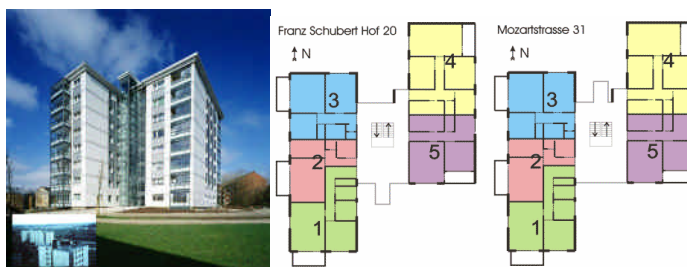


Figure 1: The tower blocks before (insert) and after the renovation.

### Renovation concept

#### Key renovation features

- Insulation of facades, floors, roofs
- Solar domestic hot water (53 m<sup>2</sup>)
- Solar glazed façade
- Daylighting
- Low E glazing
- Trombe wall
- Greenhouse per flat (buffer space)

## State-of-the-art

### Before renovation

#### Constructions [U-values: W/m<sup>2</sup>K]

- Poorly insulated roof [0.85]
- Insulated ground floor []
- Non-insulated wall [1.2]
- Single glazed window [5.1]

#### Installations

- Communal boiler for the tow buildings

### After renovation

#### Constructions [U-values: W/m<sup>2</sup>K]

- Insulation of roof, 12 cm of polystyrene [0.20]
- Insulation of ground floor: no change []
- Insulation of blind walls [0.27]
- Aluminum frame double glazed Low-E window: [2.2]
- Insulation of thermal bridges

#### Installations

- 35 m<sup>2</sup> of solar collectors (DHW)



Figure 2: details

## Energy saving and monitoring

#### Energy consumption before renovation kWh/m<sup>2</sup>:

Heating: 129.3

DHW: 31.7

#### Energy consumption after renovation kWh/m<sup>2</sup>:

Heating: 41.8

DHW: 23.5

#### Percentage saving:

Heating: 67.7 %

DHW: 26.1 %

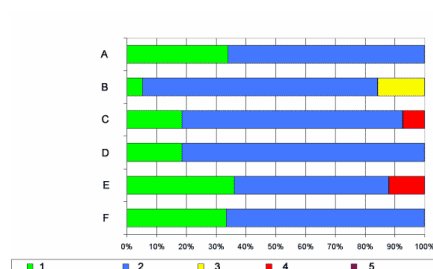
Including the comfort improvement

## Additional information

Two old multi-storey houses in Engelsby, Germany have been renovated, implementing new and innovative solar based techniques. The innovative energy elements are: Solar collectors for domestic hot water, Advanced glazed balconies, Solar walls, Advanced glazed staircases, Demand controlled moisture regulated ventilation. These elements are integrated with a new heating and ventilation system for the building. The energy demand for heating, ventilation and domestic hot water is reduced by more than 50%. Furthermore, significant improvements of the thermal comfort and the air quality have been accomplished.

## Lessons learned and conclusions

Following the refurbishment of these blocks, the housing company, BIG Heimbau, now has a very low vacancy rate and turnover, whereas before renovation this rate was approximately 30% of apartments.



#### User survey for Engelsby

- A. Appearance of Engelsby
- B. Information concerning Engelsby
- C. Temperatures
- D. Humidity
- E. Ventilation
- F. Furnishing possibilities

- 1. Very satisfied
- 2. Satisfied
- 3. Neutral
- 4. Unsatisfied
- 5. Very unsatisfied

## References

<http://www.learn.londonmet.ac.uk/packages/cdres/intro/fr/intro.html>

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