

## Plenary 5

# Connecting energy efficiency and social sustainability

– innovative approaches to housing and  
retrofitting in Freiburg, Germany

**Speaker:** Steffen Ries, Innovation Academy

**Chaired by:** Paul Isherwood

**Room:** Queens



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**2020**

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## Connecting energy efficiency and social sustainability – innovative approaches to housing and retrofitting in Freiburg, Germany



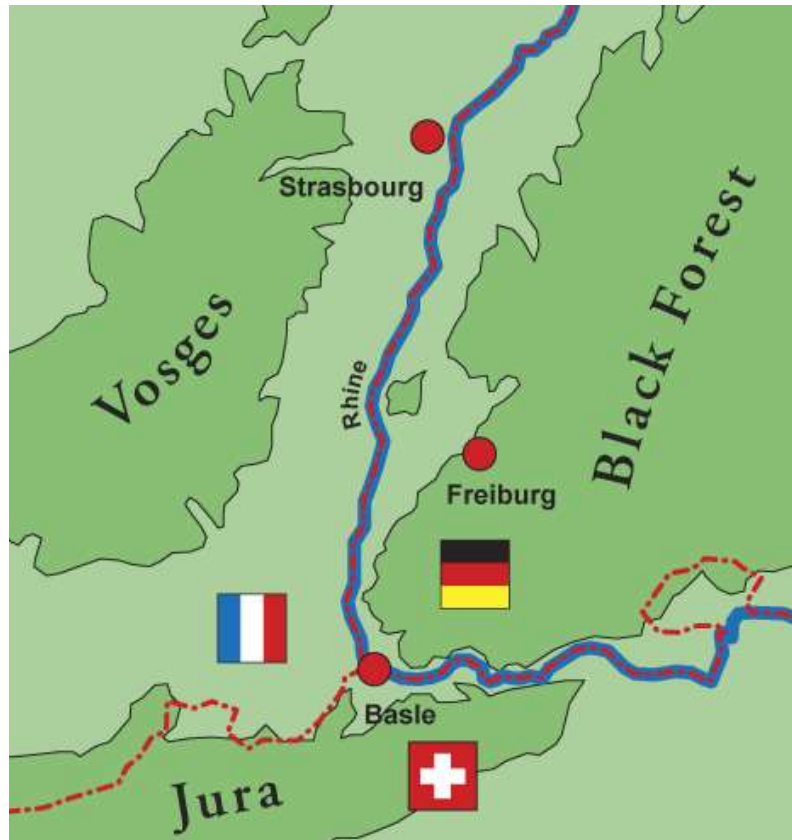
## Some figures about Freiburg

226,000 Inhabitants  
32,000 Students  
117,000 Jobs (+56% since 1987)  
5.6% unemployment rate  
65,000 In-commuter (55% of jobs)  
23,000 Out-commuter  
1.71 Mill. guest nights in 2018  
39.9 years – 2nd youngest city  
in Germany



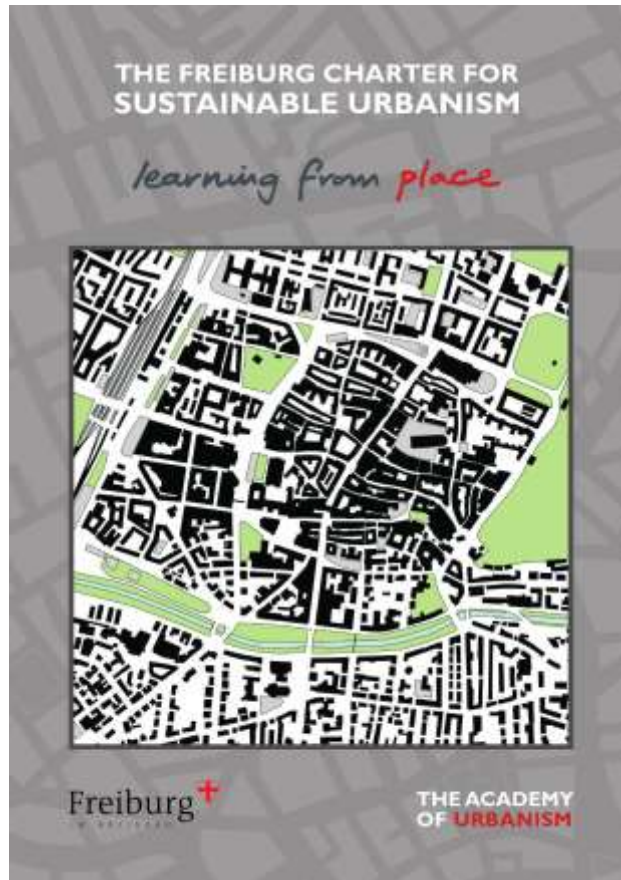
Images: Steffen Ries / Innovation Academy

## Region Freiburg



Images: Steffen Ries

## International reputation as a sustainable city



**1987:** Eco-capital

**1990:** Environmental award for outstanding achievements in municipal climate protection

**1992:** German Green Capital

**1995:** European Local Public Transport Award

**2002:** Dubai Award: "Freiburg-Vauban – Sustainable Model District"

**2007:** European OSMOSE Award

**2010:** Federal Climate Protection Capital

**2010:** The European City of the Year by the Academy of Urbanism

**2011:** Sustania 100 & UN City of the Decade

## 1975 – Resistance against nuclear power plant



Images: Archives of Badisch-Elsässische Bürgerinitiativen; Innovation Academy

## Citizen financed renewable energy projects



Images: Innovation Academy

## Renowned sustainable district Vauban



Images: Stadt Freiburg



## Vauban – mobility concept

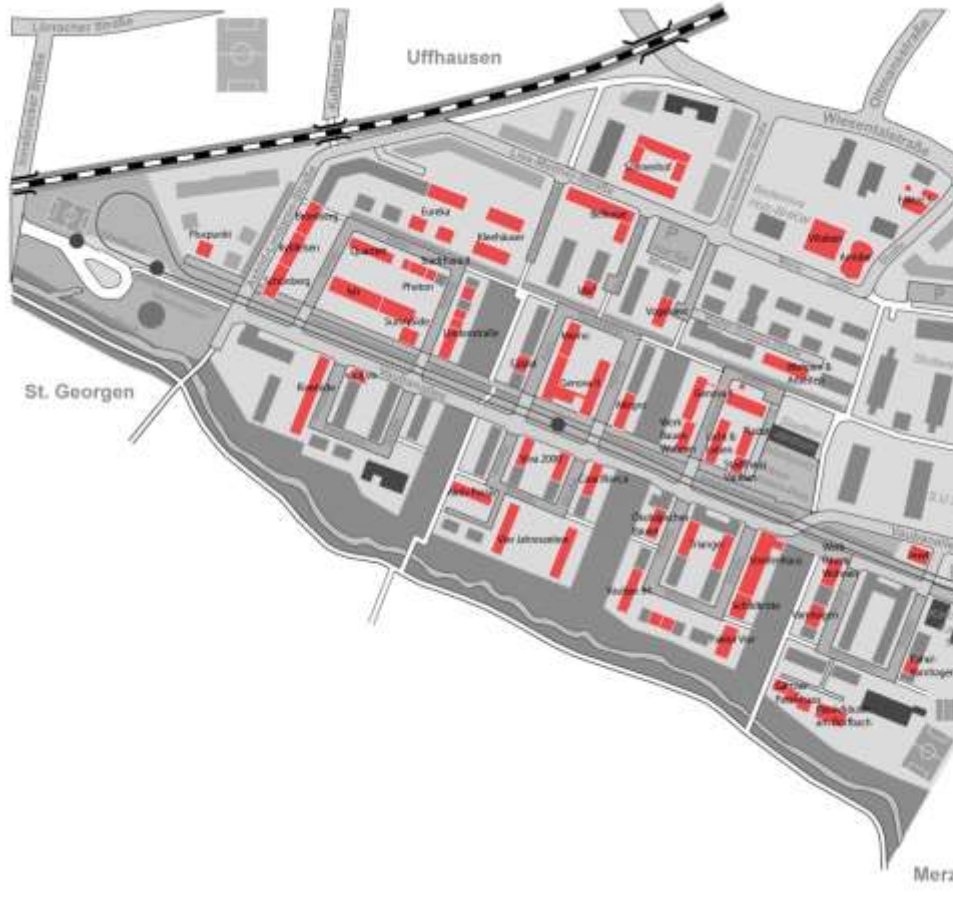


-  **Zone with parking space**
-  **Zone without parking space**



Images: Solarfabrik AG, Innovation Academy

## Vauban - joint building ventures



Images: Steffen Ries

## Freiburg's climate protection strategy

1<sup>st</sup> Climate protection concept 1997

2<sup>nd</sup> Climate protection concept 2007

Study for a climate- neutral region 2011

Decisions of the City Council in 2014:

**-50% reduction of CO<sub>2</sub> by 2030 compared to the year 1992**  
**-Climate neutral region by 2050**

**2018**

**Further development of climate protection concept with participation of inhabitants**

## Freiburg's climate protection strategy

- Six fields of action



**Climate-friendly  
Building, Town planning  
and administration**



**Sustainable heat  
supply**



**CO2-free mobility**



**Trade and  
industry**



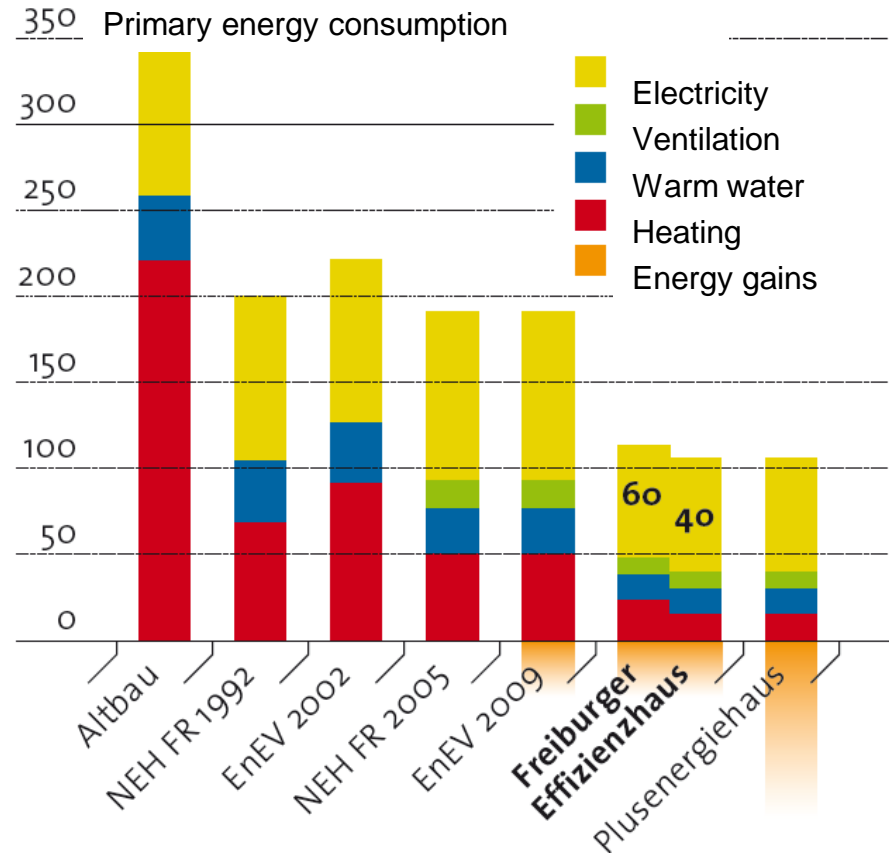
**Renewable energies**



**Climate-friendly  
lifestyles**

Graphics: Stadt Freiburg

## Strict energetic standards for new buildings



Images: Steffen Ries; Graphic: Stadt Freiburg

## Regional exhibition about low energy construction & refurbishment - GETEC



Images: FWTM

## Energy efficiency - Municipal subsidies for refurbishment



**Modul 1: Heat insulation of residential buildings – max. 7.000€ + 500€ for solar thermal heat support**

**Module 2: Funding advice – max. 600€**

**Module 3: Efficient heating system – 500€**

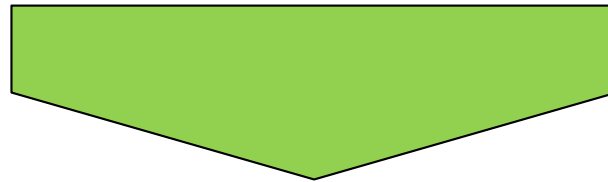
**Module 4: Energy Management System – max. 1.000€**

**Module 5: Consultation on CHP units – max. 1.450€**

**Module 6: Photovoltaic power storage – max. 2.000€**

## **Municipal housing company Freiburger Stadtbau FSB – largest housing association of the region**

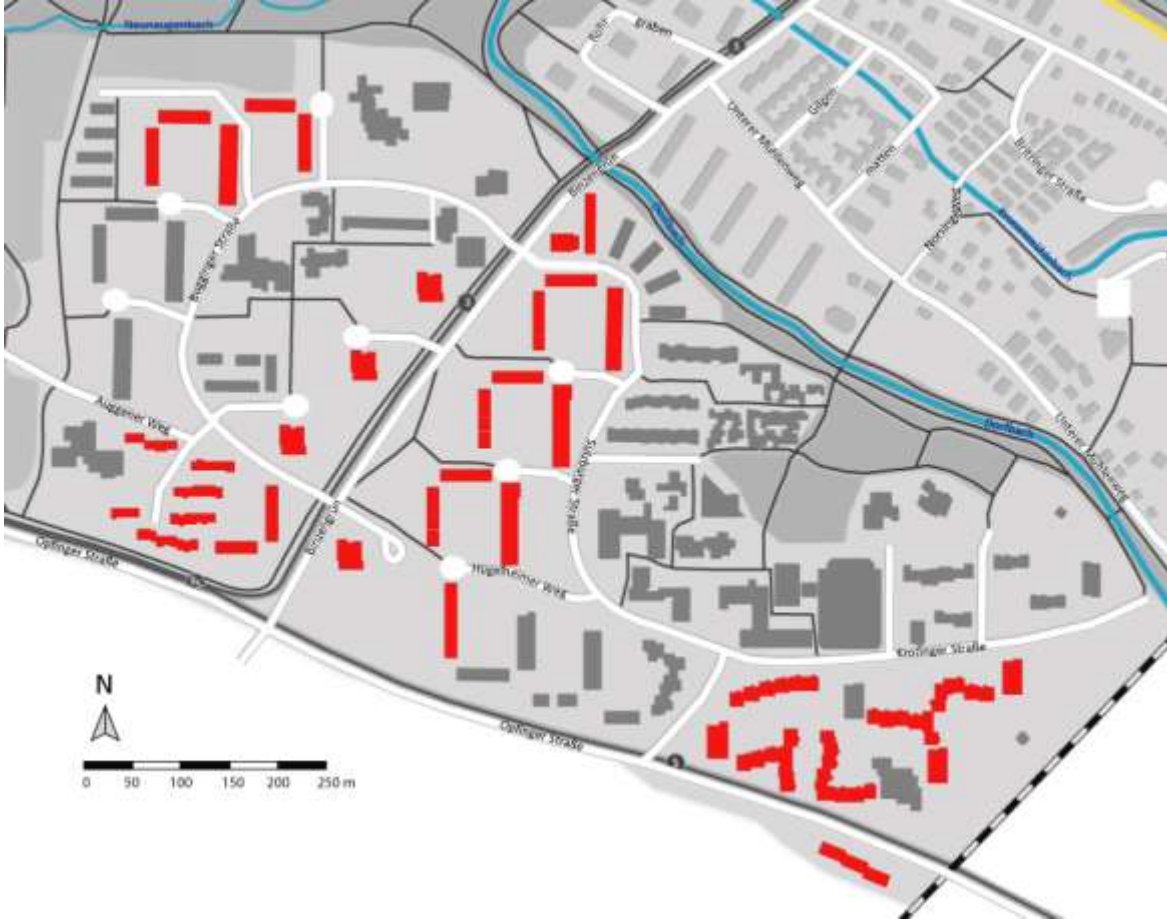
- Owns and manages 11,000 apartments in Freiburg
- The mayor is the chairman of the supervisory board
- The supervisory board mainly consists of members of the local council
- FSB is thereby committed to the city's climate protection goals



**The energetic modernization of the  
housing stock of the FSB is an  
important contribution to achieving  
the climate protection goals in  
Freiburg**



# Weingarten – Municipal building stock (FSB)



Map: Innovation Academy

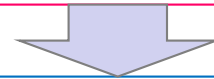
## The district Weingarten – a typical development of the 1970ies



Images: Steffen Ries

### Urban planning and architectural problems:

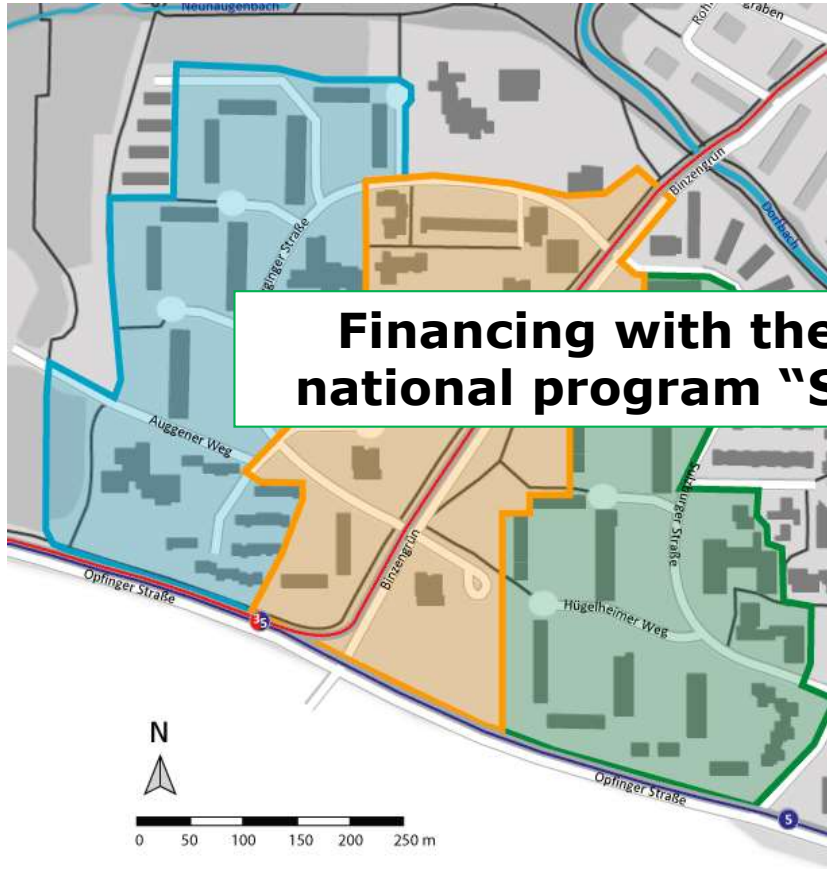
- Poor public transport connection
- Predominantly social housing
- Deficient infrastructure
- High density – monostructural architecture
- Corrosion on the exposed concrete facades
- Gray & neglected appearance
- Dark and confusing parking structures
- Overloaded elevators



### Social problems:

- Negative image => high fluctuation
- Relocation of residents with higher income
- Vacancies => no consideration for resident structure with new occupancy
- High proportion of disadvantaged resident groups
- Demographic change - high proportion of older people

## The urban regeneration project Weingarten-West



- Total residential units: 1,273
- Living space m<sup>2</sup>: 94,500
- Investment: approx. € 142 million

**Financing with the help of the national program "Soziale Stadt"**

## The program “Soziale Stadt”



Image: Bing maps

## Decision for modernisation to passive house standard of four identical 16-floor buildings



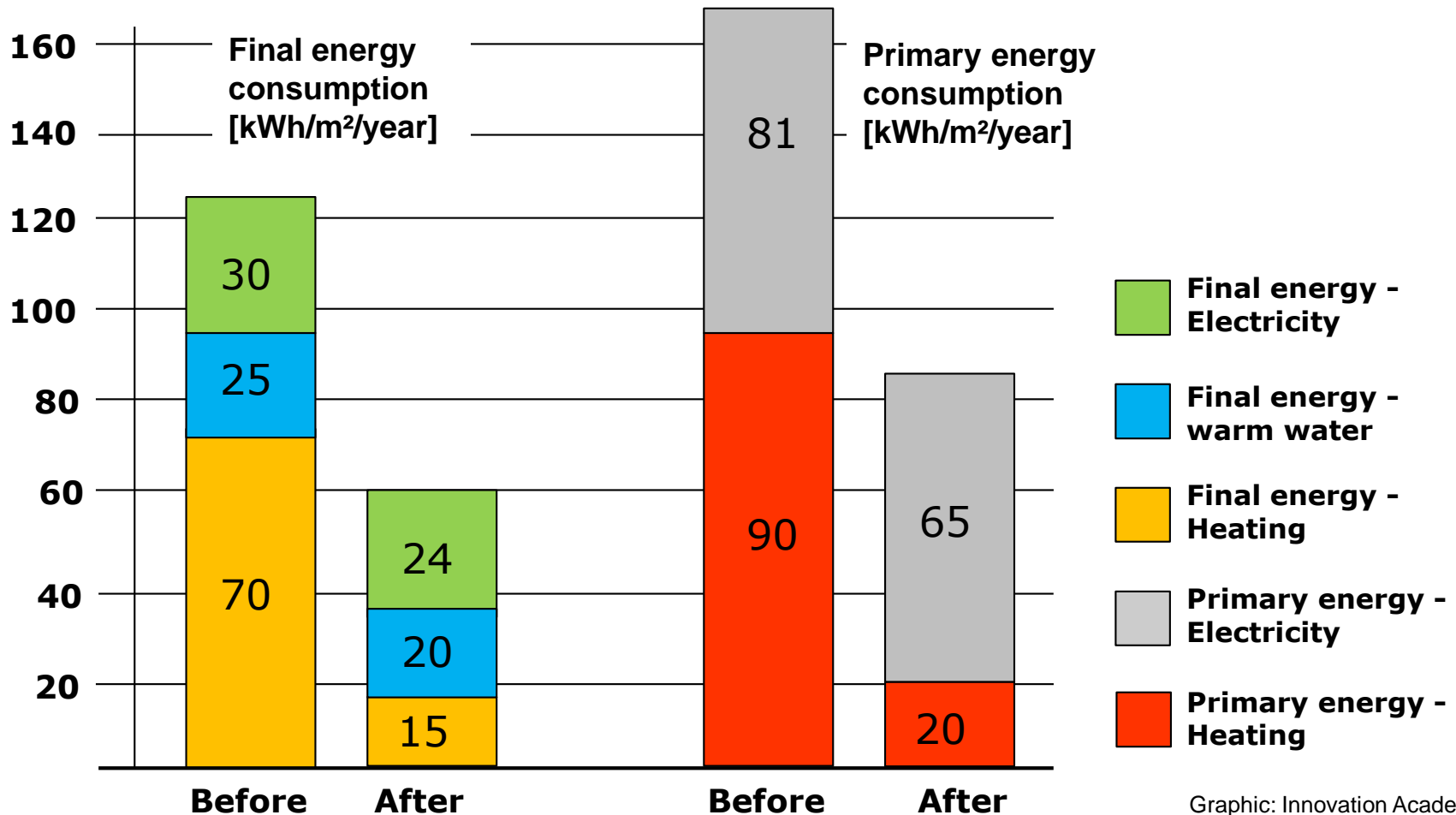
Image: Steffen Ries

## Pilot project - Bugginger Straße 50



Images: Steffen Ries

## Bugginger Straße 50 – Energy targets



Graphic: Innovation Academy

## Bugginger Straße 50 – Energy measures

Thermal insulation	U-Value
Thermal insulation of facade: 20 cm thermal conductivity category 035	$u = 0.15 \text{ W/m}^2\text{K}$
New triple-glazed windows	$u = 0.7 \text{ W/m}^2\text{K}$
Thermal insulation of roof: 2 x 20 cm thermal conductivity category 035	$u = 0.19 \text{ W/m}^2\text{K}$
Thermal insulation of basement ceiling: 20 cm	$u = 0.15 \text{ W/m}^2\text{K}$
Airtightness of the building	
Including existing balconies while also adding new thermally separated balconies	
Thermal insulation of all basement walls - thermal insulation of roller shutter boxes	



## Bugginger Straße 50 – Energy measures

### Other Measurements

New low temperature heating system (Flow temperature 50° C)

Installation of controlled ventilation with heat recovery

Energy saving lighting, elevator etc.

Energy saving lighting and devices in the apartments, standby switch etc.

Photovoltaic system on the roof in total approx. 25 kWp

## Bugginger Straße 50 – Energy measures



Image: Steffen Ries

## Bugginger Straße 50 – Original floor plan



6 units per floor

3x2-rooms with 64m<sup>2</sup>

3x3-rooms with 86m<sup>2</sup>

A total of 90 units with  
6,815m<sup>2</sup> living space

Graphic: Innovation Academy / FSB

## Bugginger Straße 50 – not selected options

**Option 1:** Energetic renovation without restructuring of the floor plan



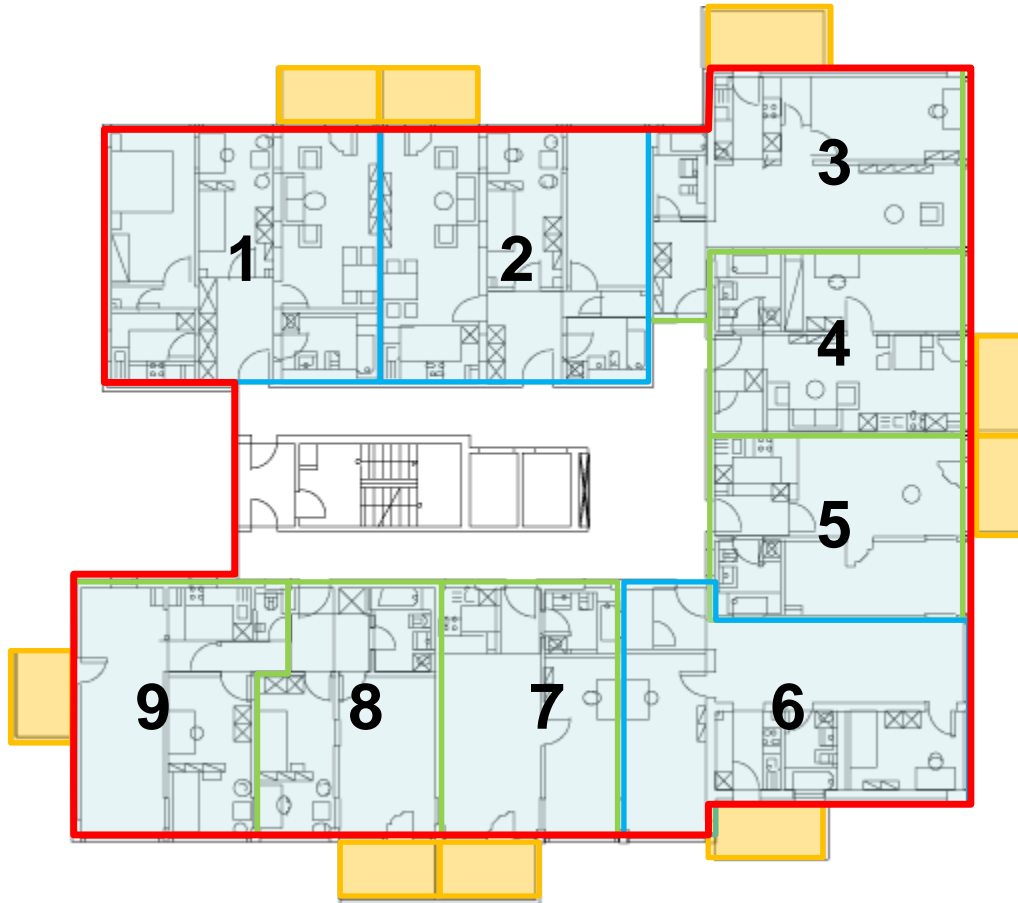
Red line = thermal envelope

**Option 2:** Glazing of the balconies as a winter garden



Graphics: Innovation Academy / FSB

## Bugginger Straße 50 – New restructured floor plan



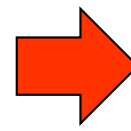
Inclusion of existing balconies while adding external balconies

9 units per floor

6x2-rooms with approx. 50m<sup>2</sup>  
3x3-rooms with approx. 70m<sup>2</sup>

A total of 139 units with  
7,750m<sup>2</sup> living space

Red line = thermal envelope

 **+ 49 units**  
**+ 935m<sup>2</sup> additional living space**

Graphic: Innovation Academy / FSB

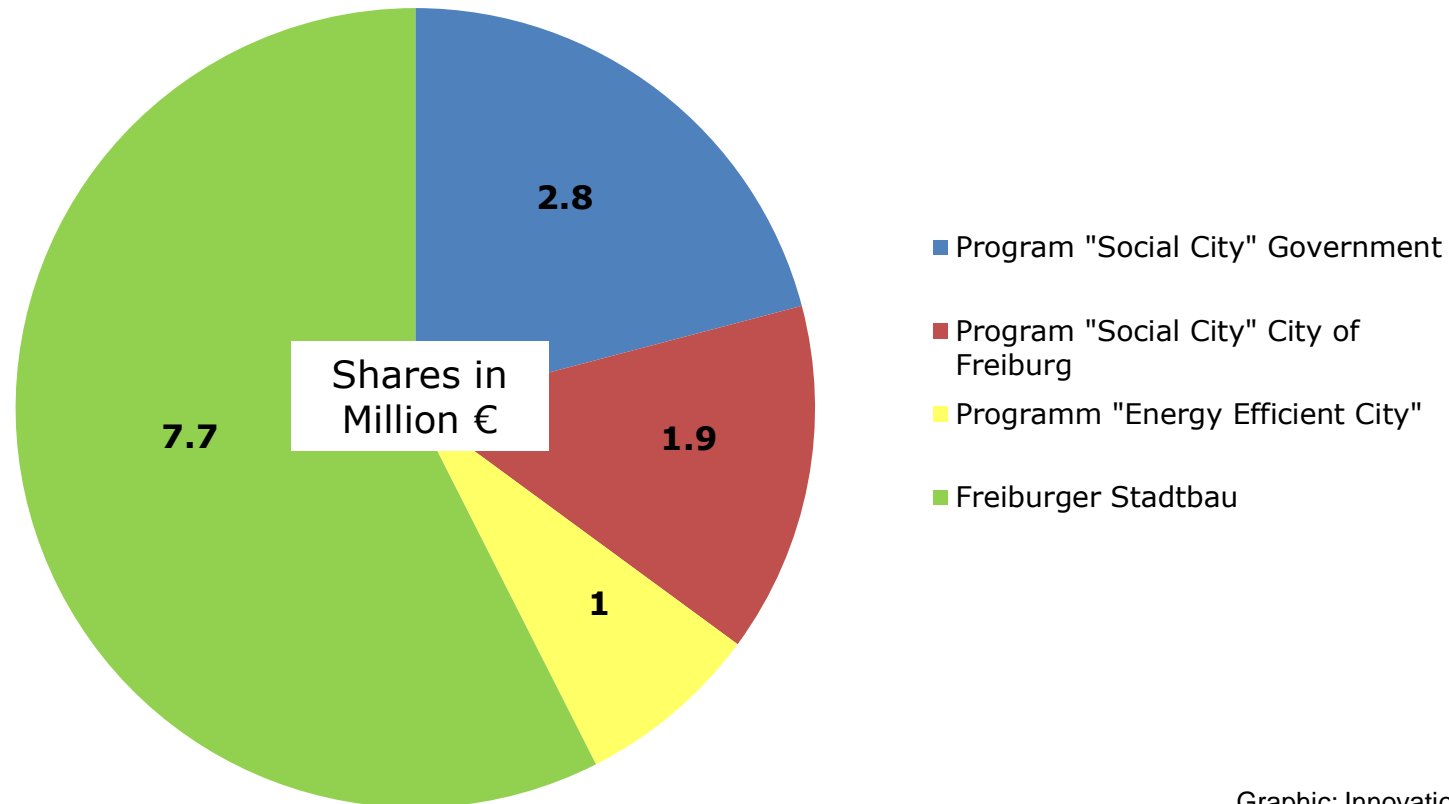
## Bugginger Straße 50 – Details



Images: Steffen Ries

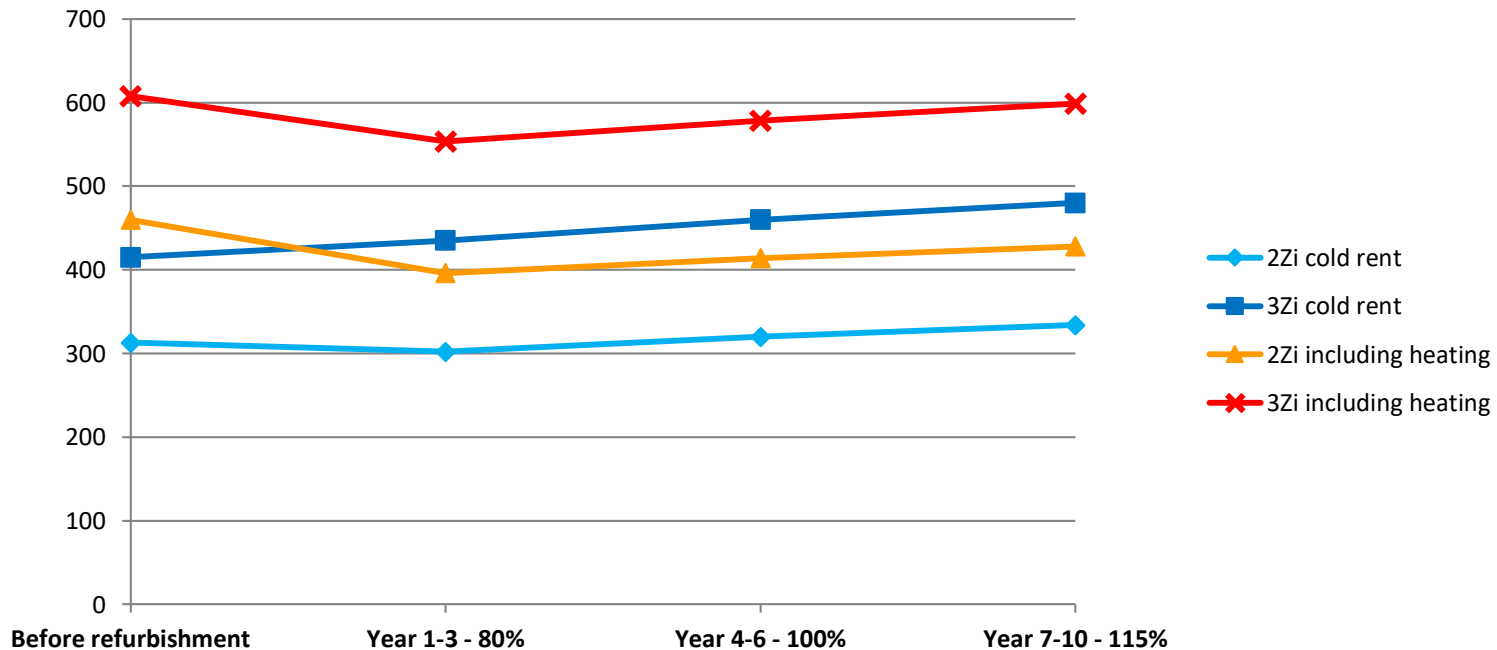
## Bugginger Straße 50 – Financial aspects

Total project costs: € 13,440,000 = € 1,680 / m<sup>2</sup> - cf. Demolition and new construction approx. € 2,200 m<sup>2</sup>



Graphic: Innovation Academy

## Bugginger Straße 50 – Financial aspects



Development of cold rent per m <sup>2</sup> :	Before refurbishment	Year 1-3	Year 4-6	Year 7-10
		4.82€	6.30€	6.67€

Graphic: Innovation Academy



## Bugginger Straße 50 - Social measures

- Citizen participation in the planning process
- 30 barrier-free apartments
- Tenants have a say in decision for new neighbors
- Seniors sport area
- Energy advice for tenants
- Video surveillance
- Community areas on the ground floor:
  - Office of social work
  - Community room with kitchen for public events and private parties
  - Concierge at the entrance
  - Guest apartment

**The social elements of the project received several awards**



**Concierge**



**Community room**

Images: Forum Weingarten

## Bugginger Straße 50 - Social measures in detail

Baustellengespräche - „Construction talks“



Images: Forum Weingarten

## Bugginger Straße 50 - Social measures in detail

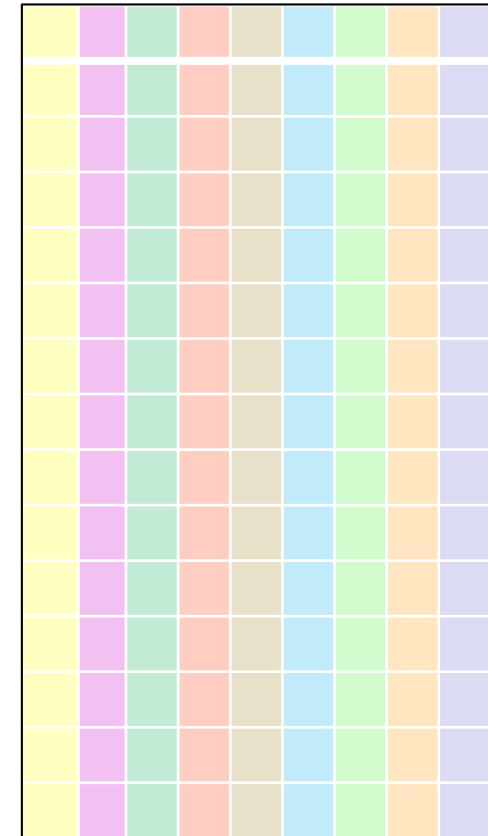
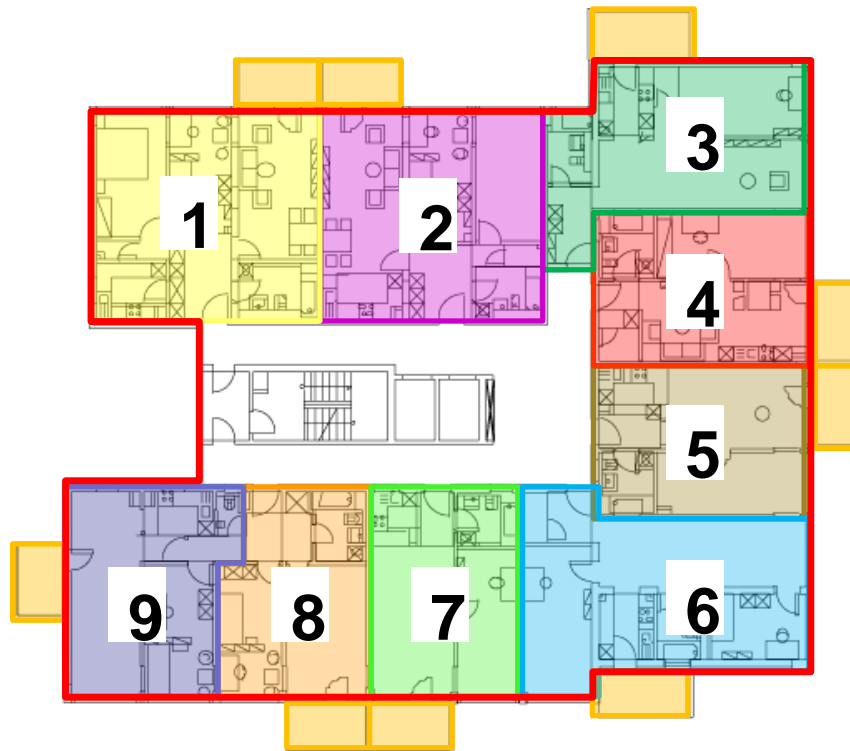
Baustellengespräche - „Construction talks“



Images: Forum Weingarten

## Bugginger Straße 50 - Social measures in detail

Stockwerksbörse - „Speed-dating to find your neighbour“



Graphic: Innovation Academy / FSB

## Bugginger Straße 50 - Social measures in detail

Stockwerksbörse - „Speed-dating to find your neighbour“



### **Speed-dating:**

Bringing residents together before moving in with the goal of residents deciding themselves about future floor neighbours - supports the creation of a strong and harmonious community

Image: Forum Weingarten

## Bugginger Straße 50 - Social measures in detail

Stockwerksbörse - „Speed-dating to find your neighbour“



Images: Forum Weingarten

## Bugginger Straße 50 - Social measures in detail

Sparfüchsinnen - „Creating economic and efficient spending habits“



Image: Badische Zeitung / Kunz

## Bugginger Straße 50 - Social measures in detail

Design of symbols for each floor



Image: FSB



## Bugginger Straße 50 - Social measures in detail

Seniorenaktivplatz – “Senior exercise area”



Images: Steffen Ries

## The initiators of the social projects

Forum Weingarten e.V. was founded in 1989 by citizens of the district Weingarten to counter the negative trends in the district with their ideas and their commitment.



**The board of Forum Weingarten**



**Social worker Christel Werb**

## Modernisation of the other buildings - Binzengrün 9



8 units per floor

38x2-rooms with 43-66 m<sup>2</sup>

33x3-rooms with 62-69 m<sup>2</sup>

27x4-rooms with 83-97 m<sup>2</sup>

6x5-rooms with 107 m<sup>2</sup>

A total of **105 units** with **7,240m<sup>2</sup>** living space  
(**+203m<sup>2</sup>**)

Total costs: 11,600,000 €

Costs per m<sup>2</sup> € 1,555 / m<sup>2</sup>

- **Community space on ground floor – 60m<sup>2</sup>**
- **Tenant garden**
- **Maintenance man instead of concierge**

Image: Steffen Ries

## Modernisation of the other buildings – Bugginger Strasse 2



9 units per floor

90x2-rooms with 41-65 m<sup>2</sup>

30x3-rooms with 73 m<sup>2</sup>

15x4-rooms with 92 m<sup>2</sup>

A total of **135 units** with **8,271m<sup>2</sup>** living space  
(+ **1.054m<sup>2</sup>**)

Total costs: 14,230,000 €

Costs per m<sup>2</sup> € 1,722 / m<sup>2</sup>

- **Kindergarten with 3 groups – 685m<sup>2</sup>**
- **Small community room on ground floor**
- **Project “Wohnverwandtschaften +” -**  
Cross-generational project with neighborly support and communal activities on two floors with 18 apartments

Image: Steffen Ries

## Modernisation of the other buildings - Binzengrün 34



9 units per floor

15x2-rooms with approx., 45 m<sup>2</sup>

75x3-rooms with approx. 71-75 m<sup>2</sup>

15x4-rooms with 95 m<sup>2</sup>

15x5-rooms with approx. 100m<sup>2</sup>

A total of **122 units** with **8,240m<sup>2</sup>** living space

Total costs: 14,230,000 €

Costs per m<sup>2</sup> € 1,722 / m<sup>2</sup>

Image: Steffen Ries

## Modernisation of the other buildings - Binzengrün 34



- After the Binzengrün 34 project was completed, the apartments were offered for sale.
- The subsidies was taken into account when determining the purchase price => affordable prices with priority for former tenants
- Purchase requirements:
  - Own use of the apartment for at least 10 years
  - Compliance with the income limits in accordance with the state housing promotion law of the state of Baden-Württemberg

**The project was criticized because none of the former tenants bought an apartment and cheap rental apartments became property.**

Image: Steffen Ries

## Modernisation “Belchenstrasse”



- Modernisation during occupancy - A sanitary container stood in front of the house while the bathrooms were being renovated
- New, spacious balconies
- Extension of the bathrooms by the area of the former loggia
- Additional floor in timber construction with 6 new apartments per building
- Kitchen is not part of the apartments - tenants bring their own kitchen (relatively common in Germany)

Images: Steffen Ries

**Thank you for  
your attention**



**Hope to  
see you in  
Freiburg**

