

# EU-GUGLE

Explaining the impact of sustainable renovation

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## VIENNA

District	Penzing
Surface affected	~68,783m <sup>2</sup>
Type of buildings	residential buildings and social housing from the 50s and 70s, owned by tenants and flat owners
Target	Up to 61% primary energy savings

### Technical measures:

- High insulation and decentralised ventilation.
- Thermo dynamic optimisation via simulation and monitoring.
- Multi-Active Façade combined with PV.
- Building Integrated PV (BIPV) combined with heat pumps, solar thermal integrated in district heating.
- Replacement of decentralised fossil heating systems by centralised renewable heating plants allowing contracting.

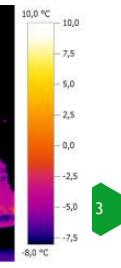
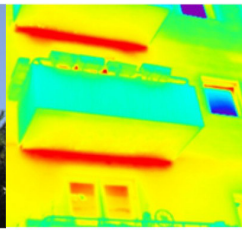
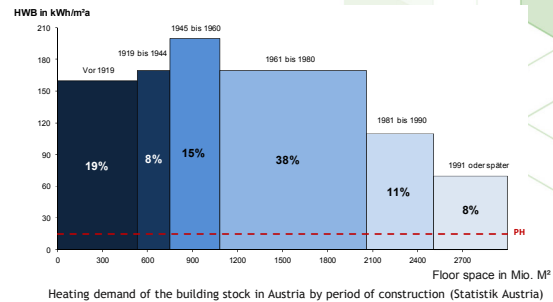
### Non Technical measures

- Socio-economic evaluation.
- Participatory action research.
- Symbiotic integration of green power marketing.



## Current situation

- Noise pollution  
Heavy traffic on the street
- Thermal bridges
- Mold
- Draughts
- Low quality of living
- High heating costs
- Heating demand ~ 150 kWh/(m<sup>2</sup>a)



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## Current situation

- Low rent of the tenants -> Challenge
  - “No personal monetary gain” through funding
- Considering energy poverty
- Many actions to involve the tenants
  - Information
  - Training
  - Events



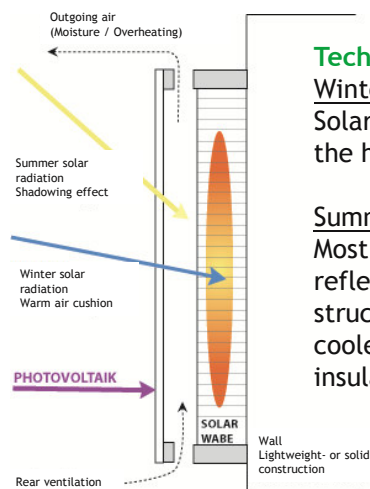
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## Implemented measures

- Multi-activ-façade
- Triple glazing windows
  - U-Value 0,8 W/(m<sup>2</sup>K)
  - G-Value 0,5
- Decentralized controlled domestic ventilation
- High thermal insulation
- Air tightness
- Prevention of thermal bridges



## Sustainable renovation



Scheme Multi-Activ-façade

### Technology

#### Winter

Solar energy penetrates deep into the honeycomb and warms it up

#### Summer

Most of the solar radiation is reflected, due to the honeycomb structure. → The honeycomb stays cooler than a conventional thermal insulation.



## Impact of the renovation



- **Comfort**  
the matched surface temperature at the inside wall ensures uniform temperature and wellbeing
- **Maintenance**  
the facades are weather-resistant and maintenance-free
- **Noise protection**  
high sound insulation through the glass-honeycomb combination
- **Environment**  
better insulating properties reduce the heating costs, the use of environmentally safe components protects the environment
- **Health**  
the vapor permeable facade ensures mold-free rooms
- **Housing technology**  
the thermally stable shell allows simplified systems
- **Economic efficiency**  
Energy costs are drastically reduced
- **Heating demand** - 14 kWh/(m²a)



## Next Steps



- Integration of a gas free heating concept in the renovation model
  - No more maintenance should be needed for the gas boilers (reducing the costs for the inhabitants)
- Additional PV on the roof
- Small decentralized heat pumps with warm water boilers
- No more air vent openings are needed for a safe operation of the gas boilers
- Elimination of formaldehyde that is created by gas stoves



## Contact

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