

Energetic Refurbishment with Factor 10



Construction 1930

- ▶ Solid brick masonry, uninsulated
- ▶ Box-type windows (single glazing)
- ▶ Heating load: **204 kWh/(m²a)***
- ▶ Complaints about cold draught
- ▶ Only minimal rents feasible



Refurbishment 2002

- ▶ Using Passive House Components
- ▶ During inhabitation
- ▶ Heating load: **27 kWh/(m²a)*** **Δ - 87%**
- ▶ High Quality interior climate
- ▶ Adequate rents accepted

Architect: Burkhard Schulze Darup

* 3,500 degree days base

How to Make an Old Building Fit for Future

▶ Highly Insulated Building Envelope

- External walls: 20 cm * >>> $U = 0.15 \text{ W}/(\text{m}^2\text{K})$
- Top level ceiling: 25 cm * >>> $U = 0.12 \text{ W}/(\text{m}^2\text{K})$
- Cellar ceiling: 14 cm * >>> $U = 0.19 \text{ W}/(\text{m}^2\text{K})$

* High Quality Insulation $\lambda = 0.035 \text{ W}/(\text{mK})$

▶ High Quality Windows (Passive House Standard)

- 3 panes, insulated frames, optimised glass spacer
- $U_{\text{window}} = 0.85 \text{ W}/(\text{m}^2\text{K})$

▶ High Efficient Ventilation System for Each Flat

- Supply/exhaust air, heat recovery with efficiency >80%, DC-fans

▶ Precise Planning

- Reducing Thermal Bridges
- Aiming at air tightness

▶ Quality Assurance

- Instructions for careful work + **continious** presence of expert
- **Accompanying** checks (Blower Door, Thermography) + **immediate** correction of faults

Good Reasons for Refurbishment with Factor 10

- ▶ Significantly improved quality of the building
- ▶ Preservation of structures due to external insulation
- ▶ Prevention of mould due to ventilation system
- ▶ High level of dwelling comfort
 - lasting attractive for tenants
 - reduced vacancy and fluctuation
- ▶ Long-term Insurance against high energy costs
- ▶ With increasing energy prices, additional costs will be amortised sooner
- ▶ Wellbeing, energy scarcity and climate change require high efficient buildings
- ▶ The **RIGHT** energy standard **NOW**
 - because re-refurbishment in 15...20 years is unprofitable in any case !