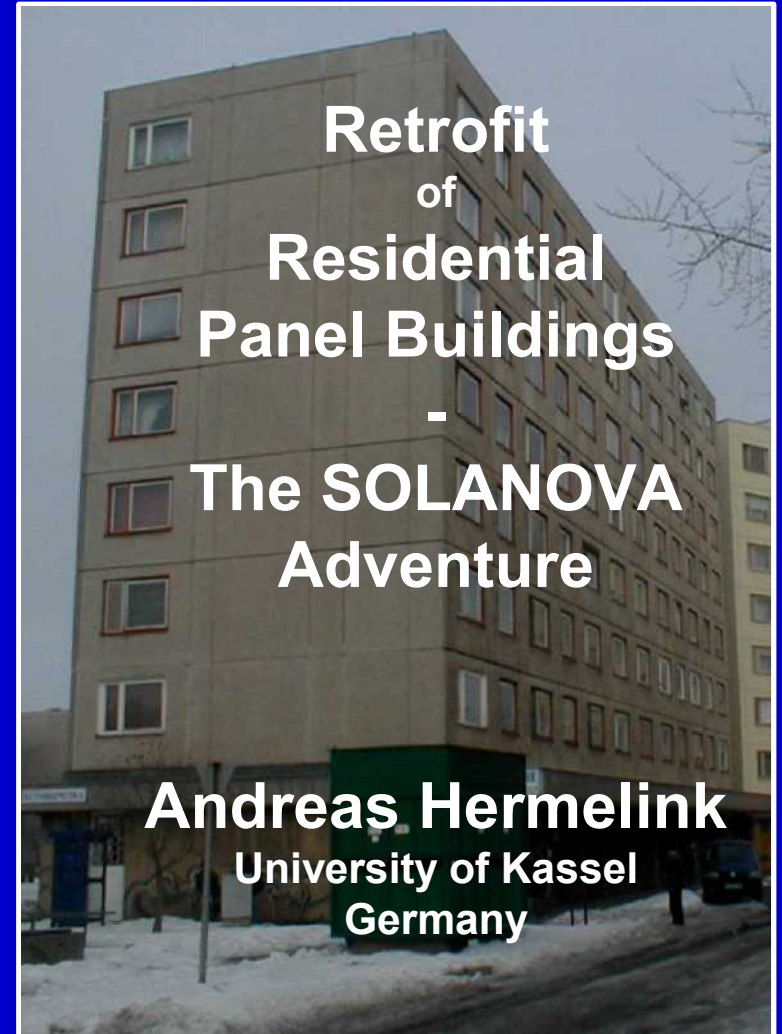




SOLANOVA



**Retrofit
of
Residential
Panel Buildings
-
The SOLANOVA
Adventure**

**Andreas Hermelink
University of Kassel
Germany**



SOLANOVA – The Meaning

Academic Title:

**Solar-supported, integrated eco-efficient
renovation of large residential buildings
and heat-supply-systems**

Integrated optimum

of

Demand Side

(buildings & dwellers)

AND

Supply Side incl. Solar Energy

(Building, Quarter, Town)



SOLANOVA - Expectations

Citation from Hungarian Newspaper

After renovation the 7-story building in King Lajos Street will be the most advanced panel building in the world.



SOLANOVA - Symbiosis

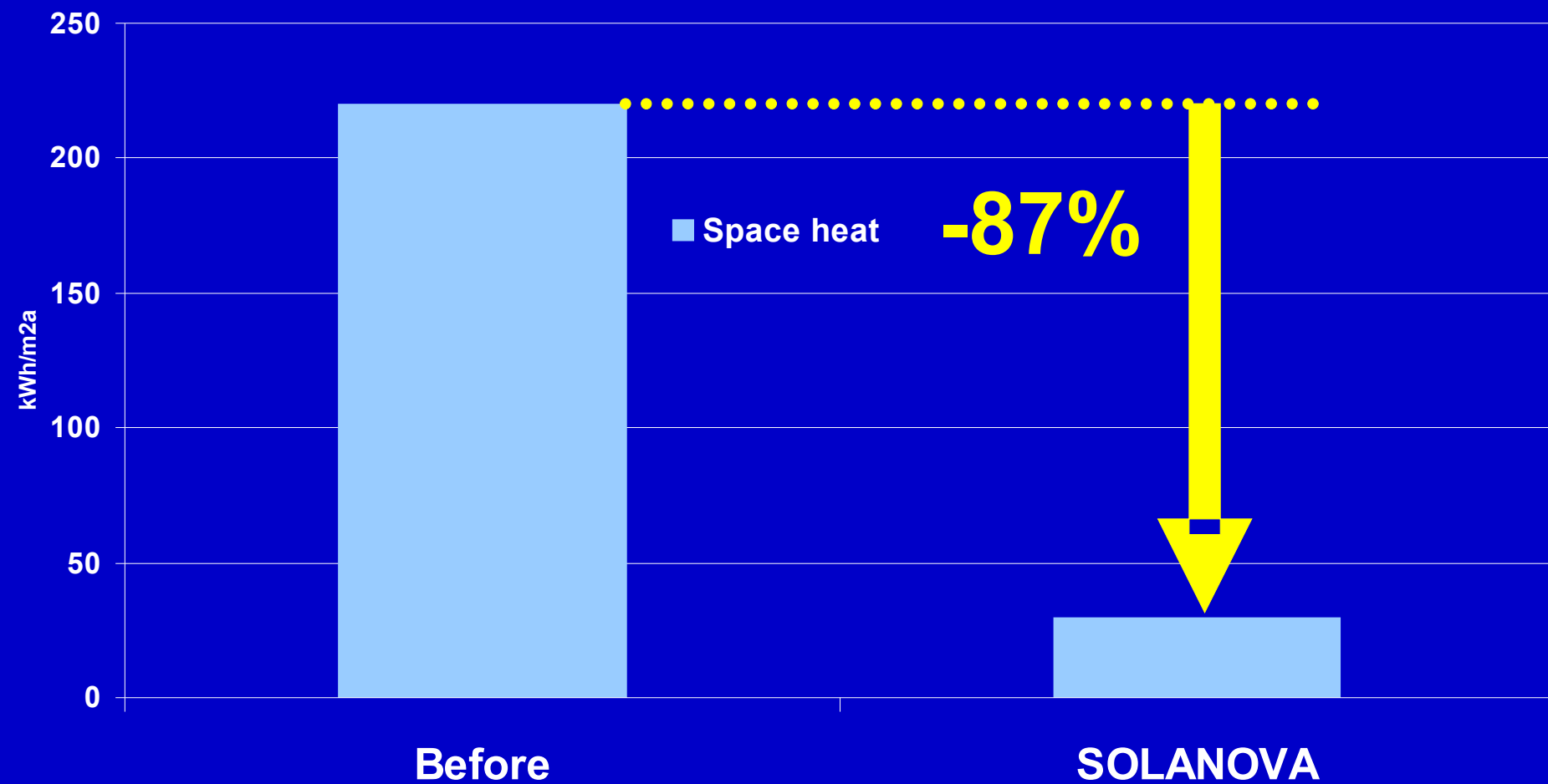
Efficiency

(buildings & dwellers,
supply systems)

**Solar
Energy**
(Building, Quarter, Town)

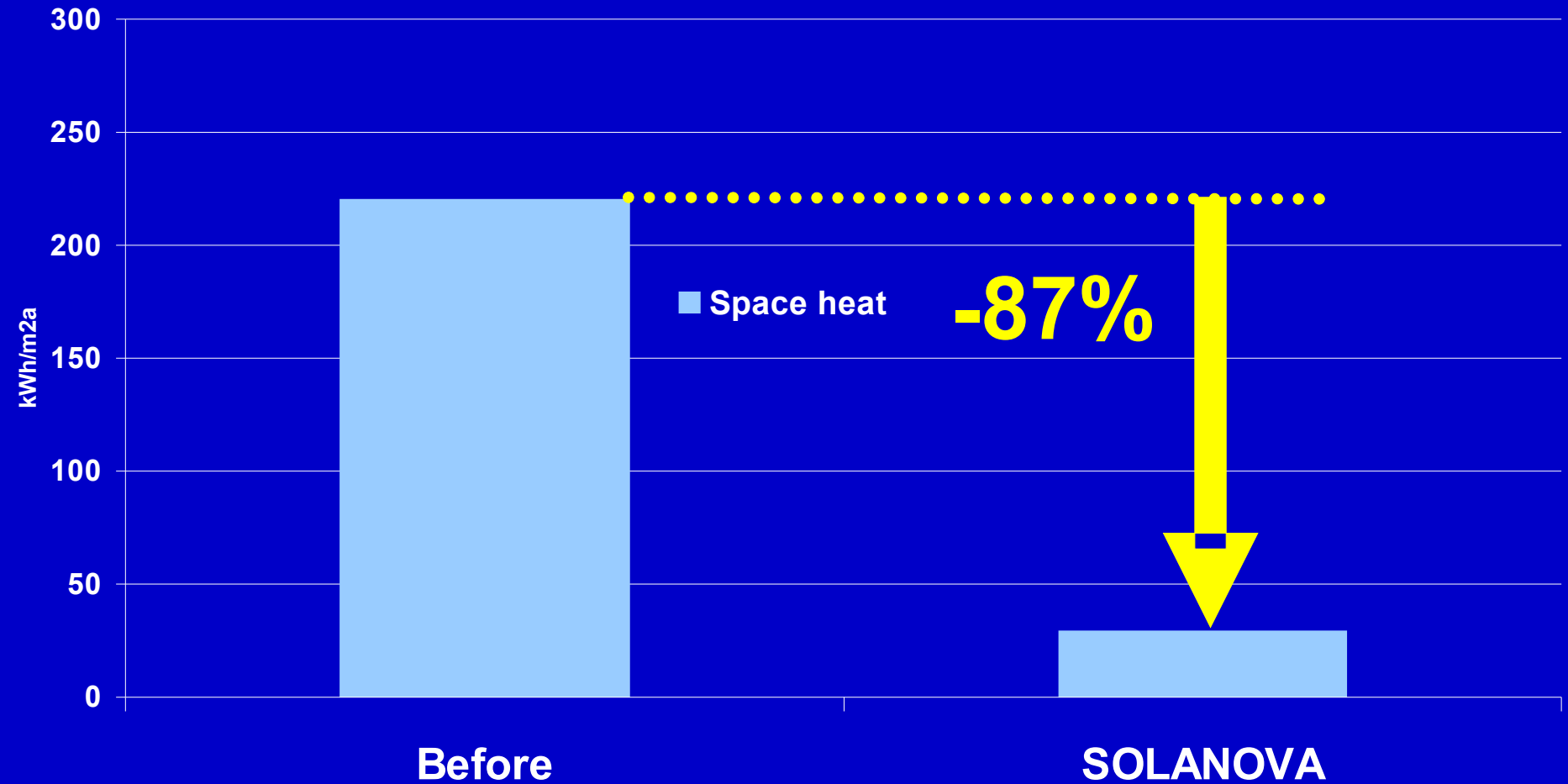


SOLANOVA – Factor 10 Philosophy



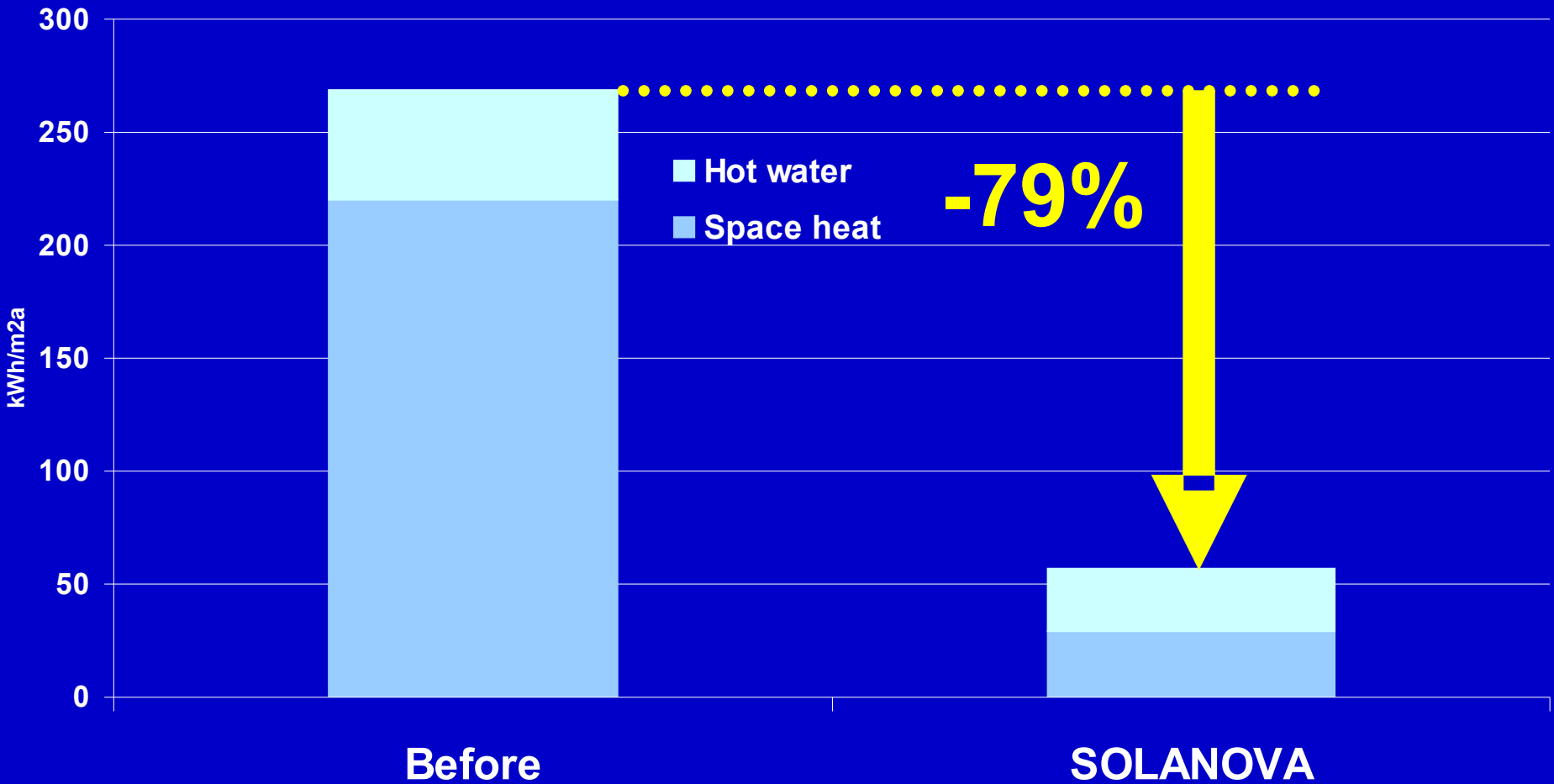


SOLANOVA – Factor 10 Philosophy



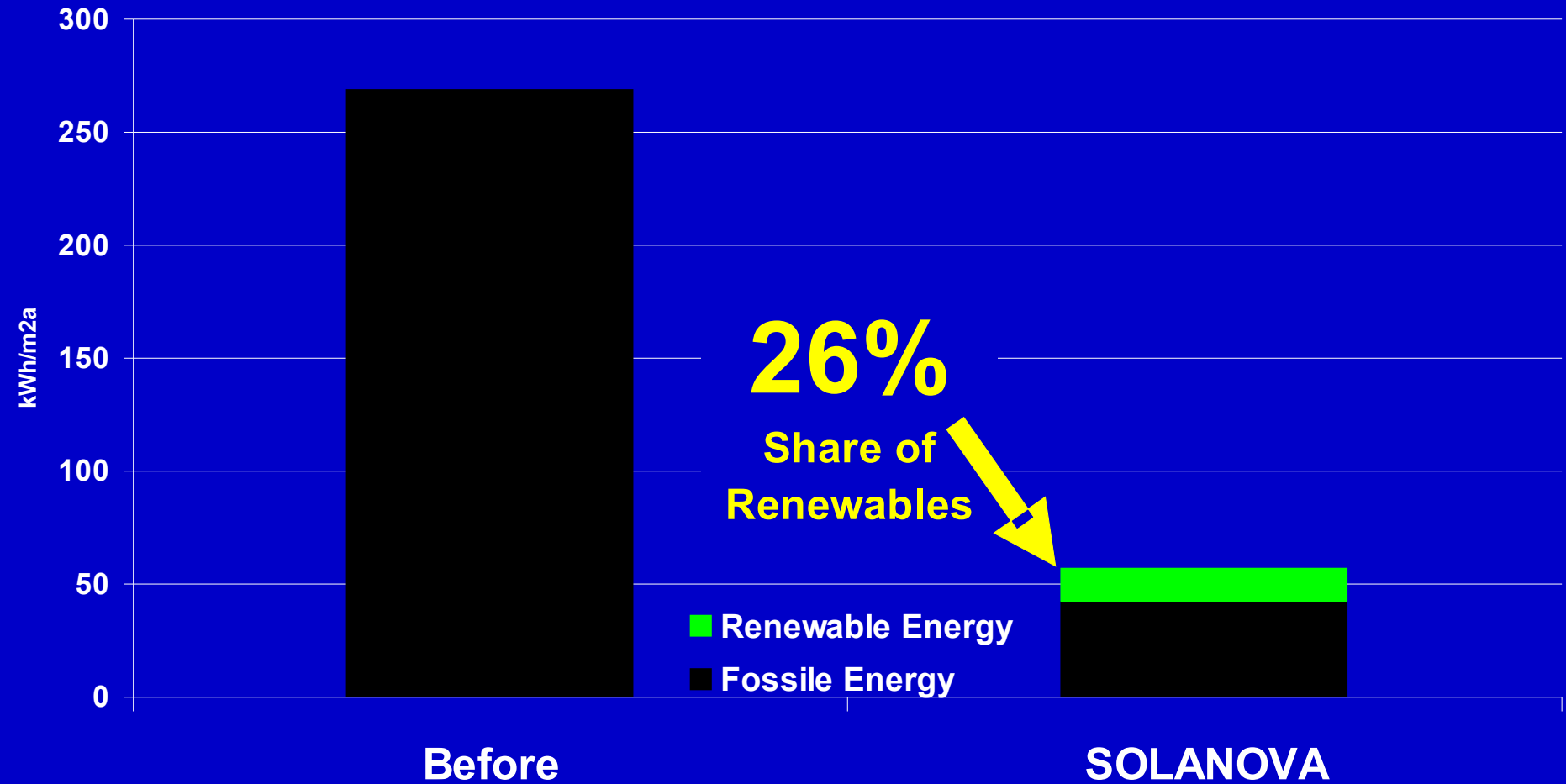


SOLANOVA – Factor 10 Philosophy



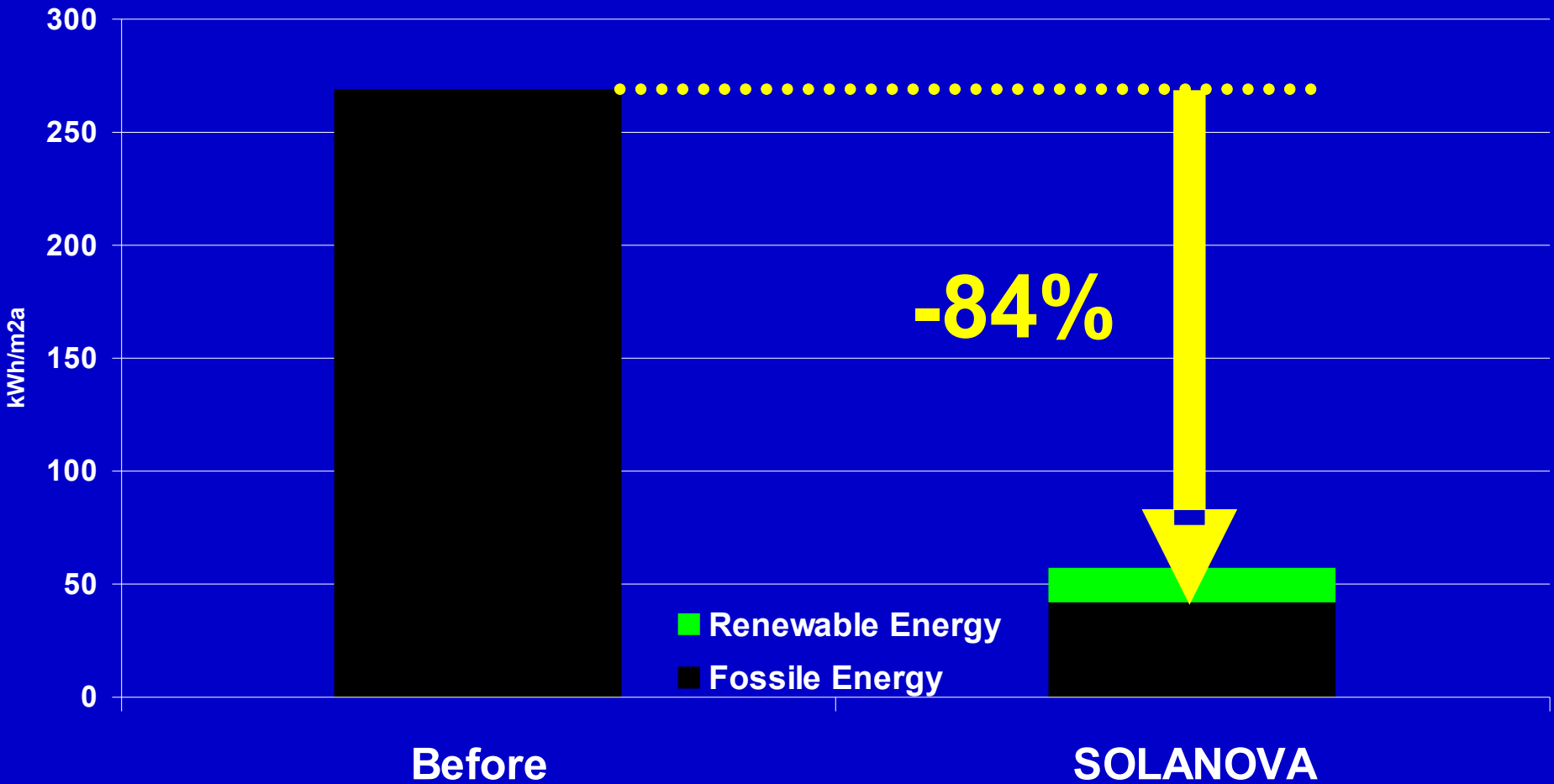


SOLANOVA - Much More Solar ...

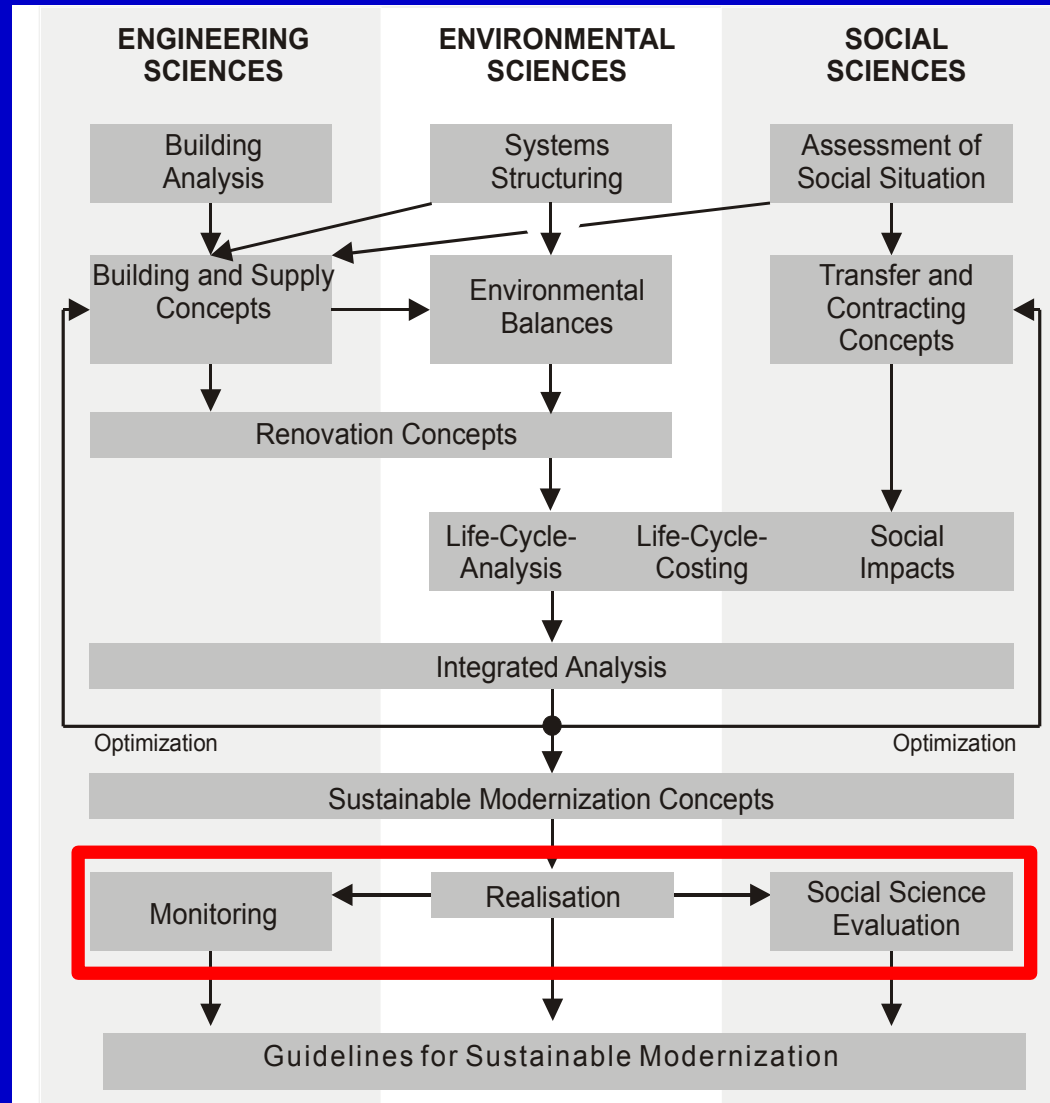




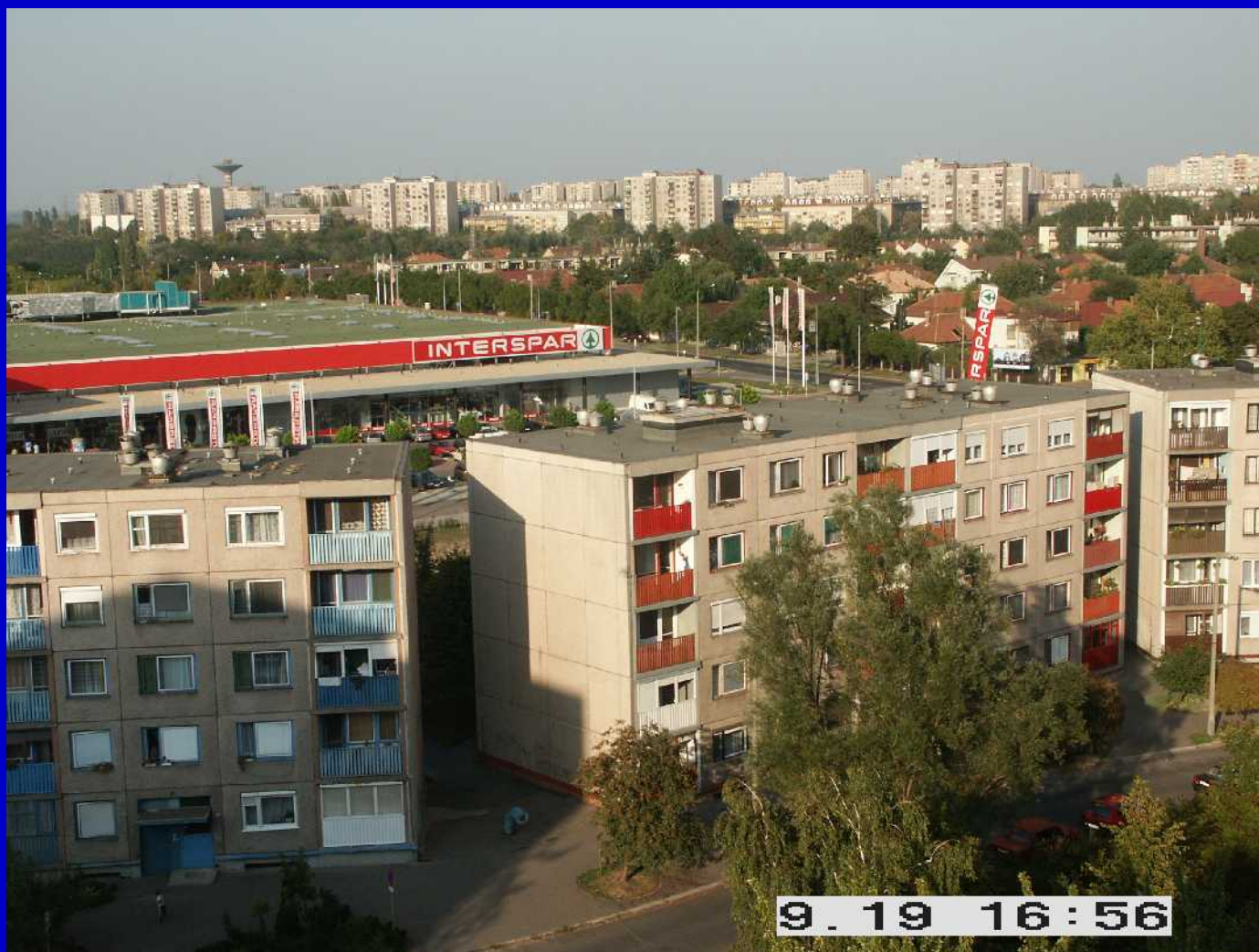
SOLANOVA – ... Much Less Fossile



SOLANOVA – The Process



Demo-City Dunaújváros



Demo-Building and Neighbourhood

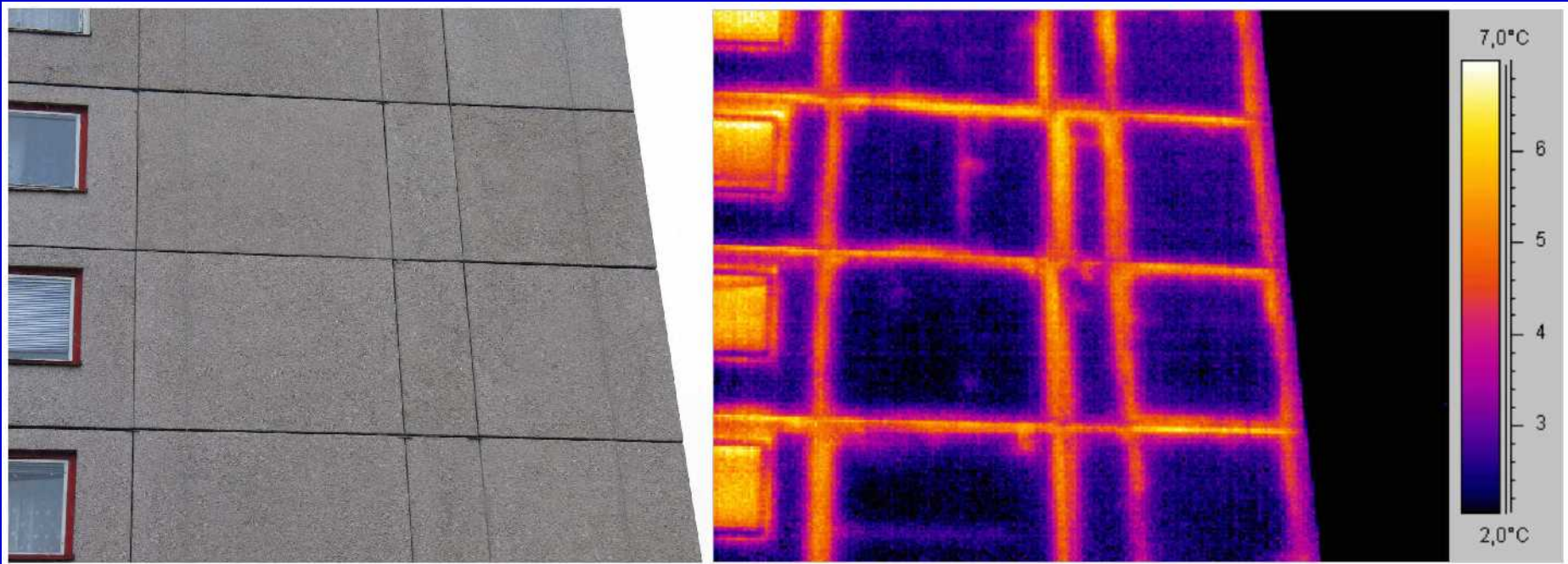


Demo-Building: Southern View





Demo-Building: Western View



Demo-Building: Northern View



Demo-Building: Shops, Original





Technical Features Original State

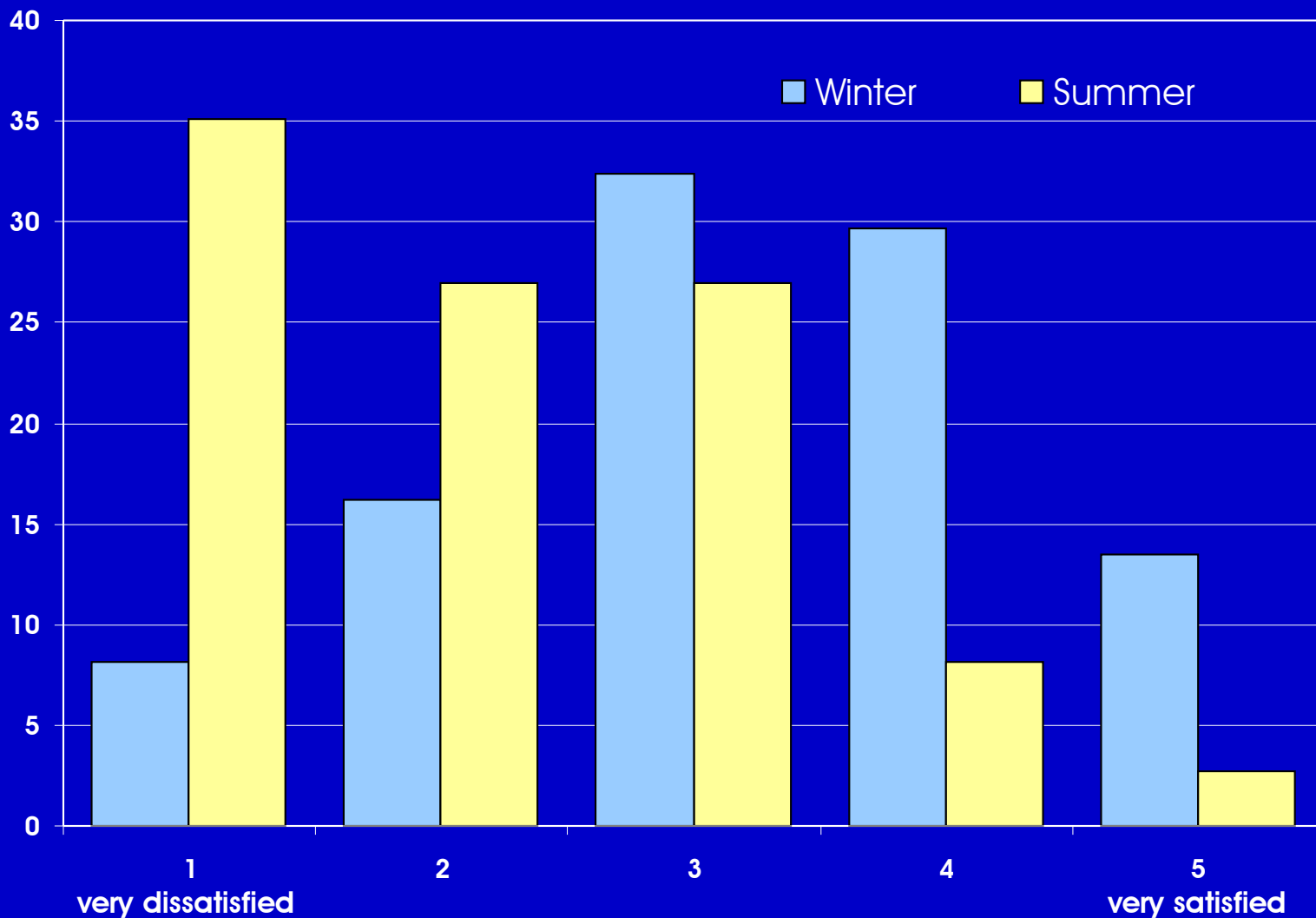
- Year of construction: 1978
- Lifetime load-bearing elements: 100-150 a
- Extremely high thermal bridge losses
- Untight, badly insulated flat roof
- Very untight windows
- Uncontrollable single pipe heating system
- District heating
- Exhaust air system, inner bathrooms/WCs
- 1 shop floor, 7 living floors



Social Aspects

- Owner occupiers
- Very low income
- 2.8 Persons/flat (Germany: 2.1)
- 19 m²/person (Germany: 41)
- High maintenance cost
- Factor 10 in current costs since 1990
- Refurbishment in occupied flats!

Satisfaction with Indoor Temperature



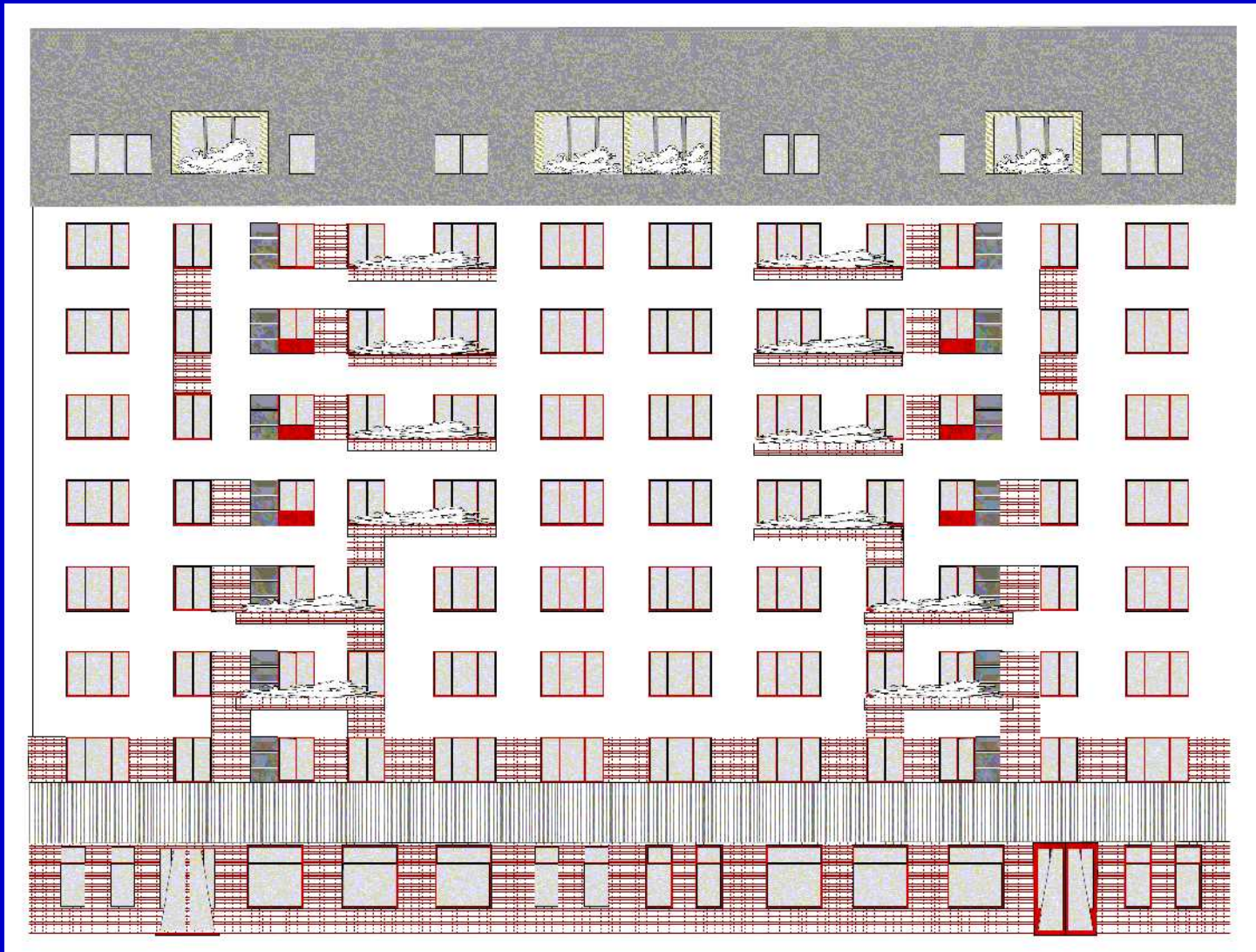
1st Architectural Concept



1st Architectural Concept



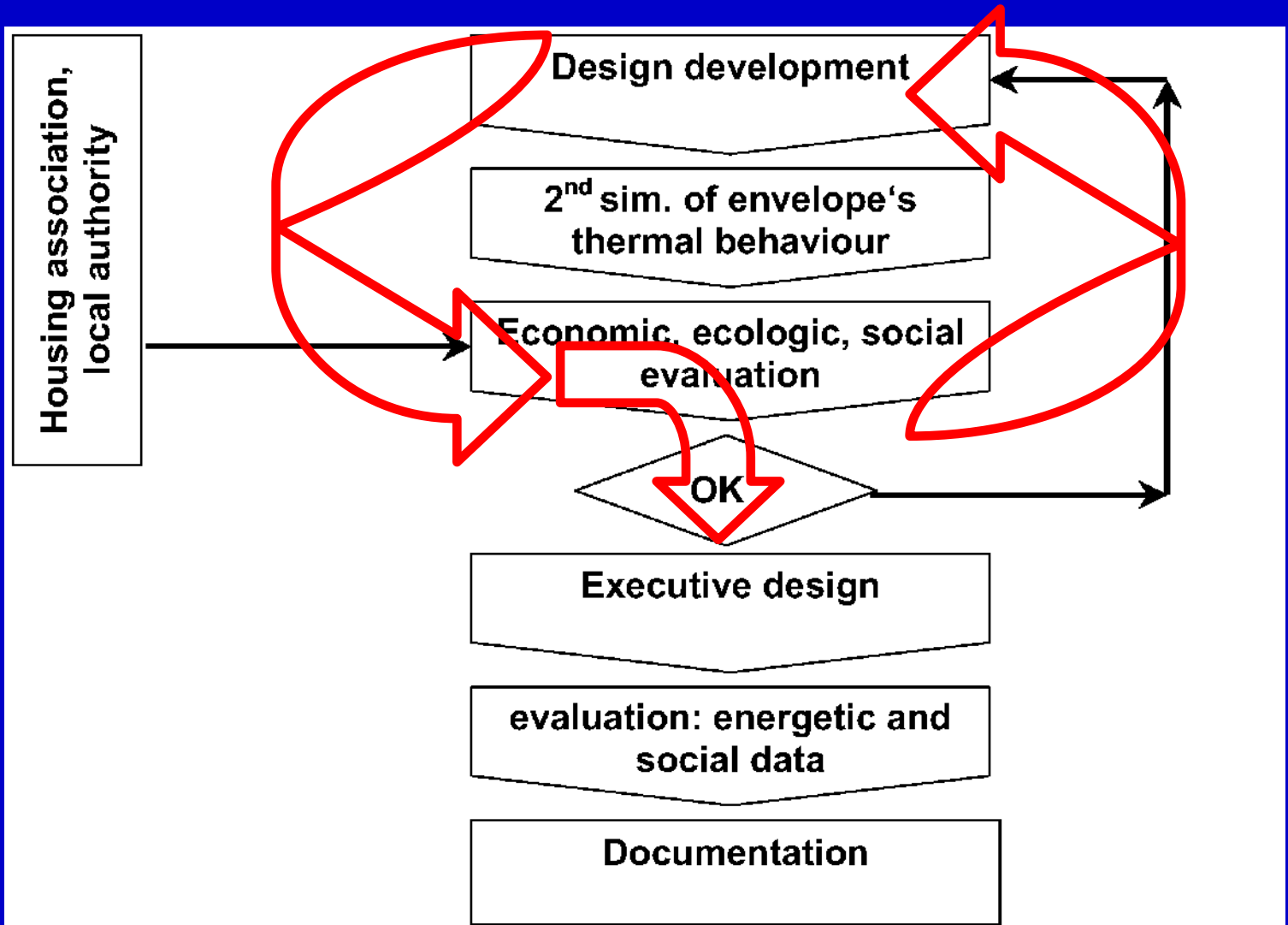
1st Architectural Concept



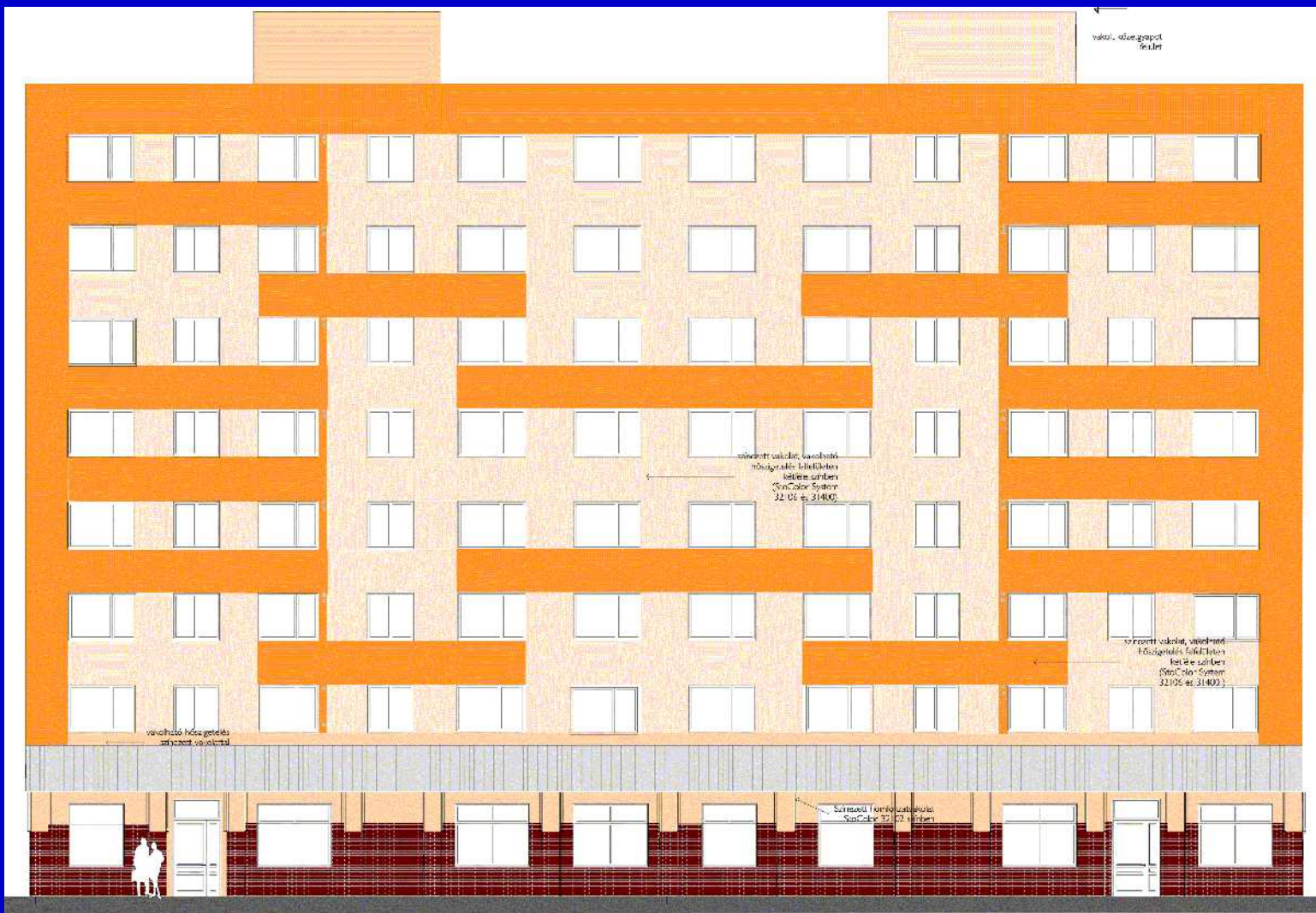
Financial Constraints



SOLANOVA – Circles

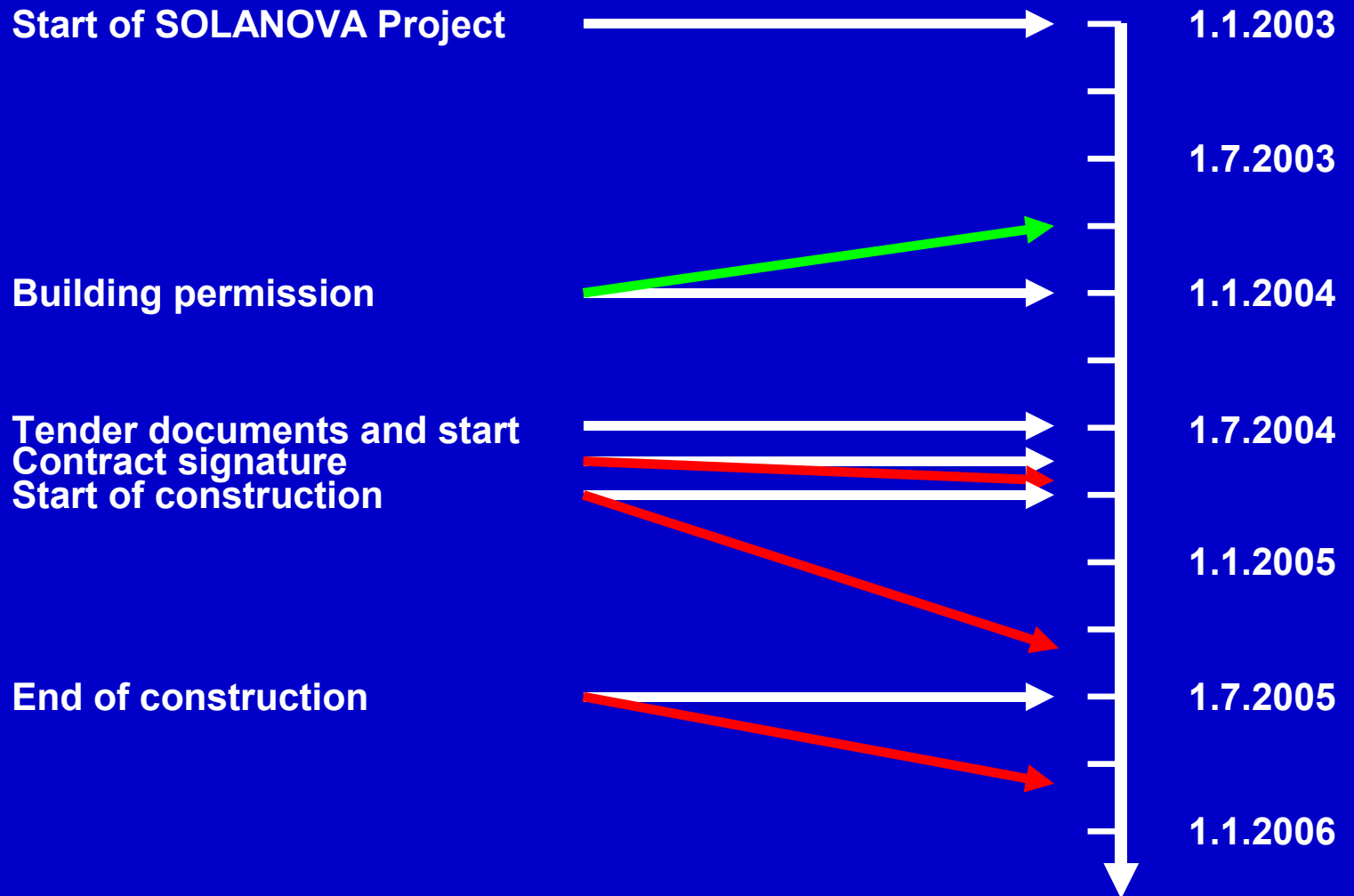


Final Architectural Concept





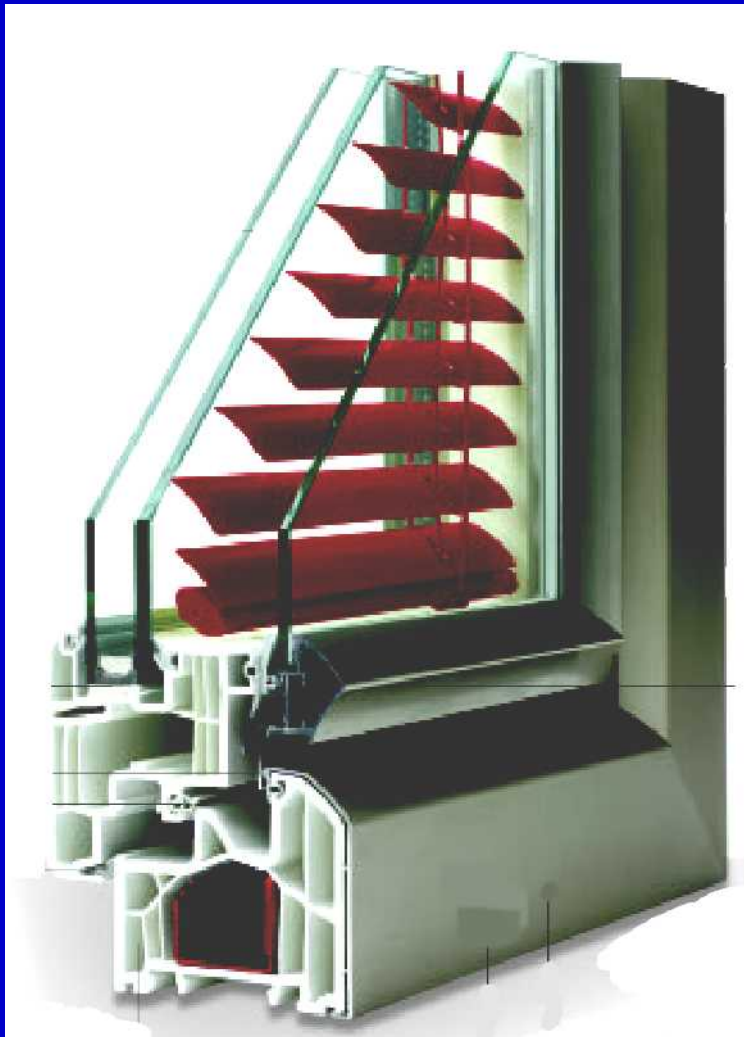
Milestone Schedule



Technical Measures Overview

- Decentral ventilation units with 82% real heat recovery, one ventilation unit per flat
- Ca. 75 m² solar thermal area as canopy
- Easy heating system solution with radiators
- 10 cm insulation of cellar ceiling
- Roof insulation: 30-40 cm with green roof
- Wall insulation: 16 cm polystyrene
- Flats' windows:
 - S and W: 2+1 glazing, shading, $U_w = 1.1$
 - N: 2-glazing, $U_w = 1.4$
- Groundfloor windows: U-value: 1.4

2+1 Window for Summer Comfort

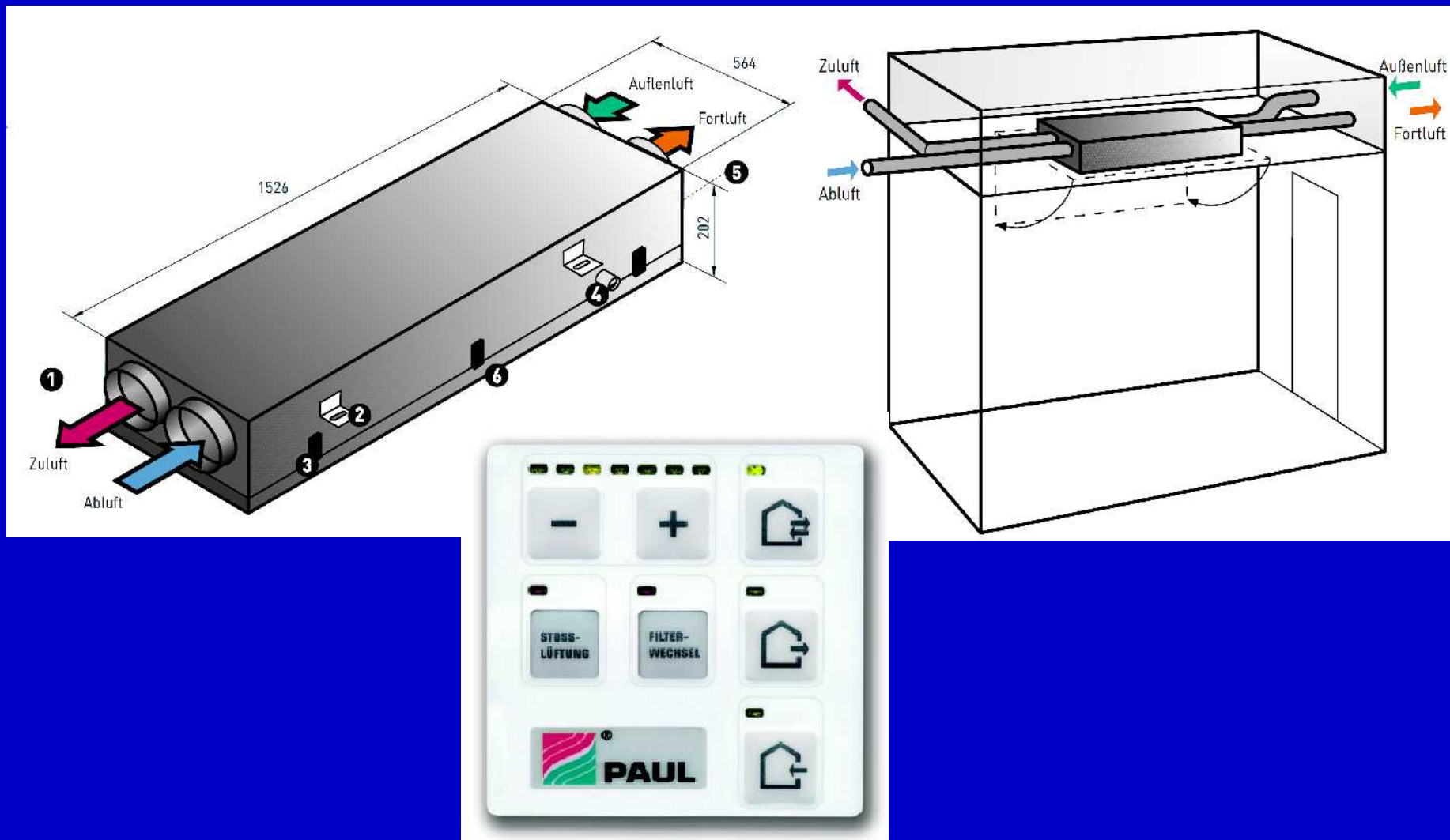




Ventilation System, Criteria

- Replication potential
- Availability on the market
- Investment costs, operational costs
- Maintenance (access, availability of spare parts, risk of failure)
- Disturbance caused by installation (noise, dirt)
- Comfort (noise, thermal, odours)
- Easiness of handling and control
- Space requirements
- Suitability for Hungarian cooking habits
- Requirements of fire protection

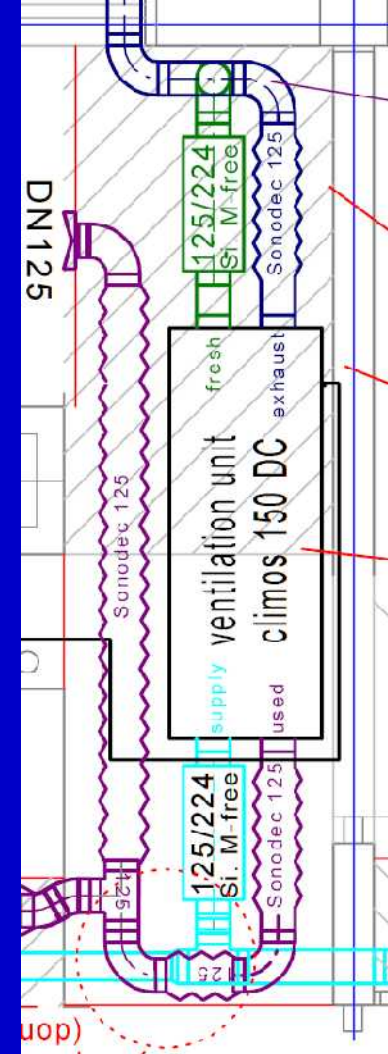
Ventilation System, Solution



Current state



Current state



Current state



Current state



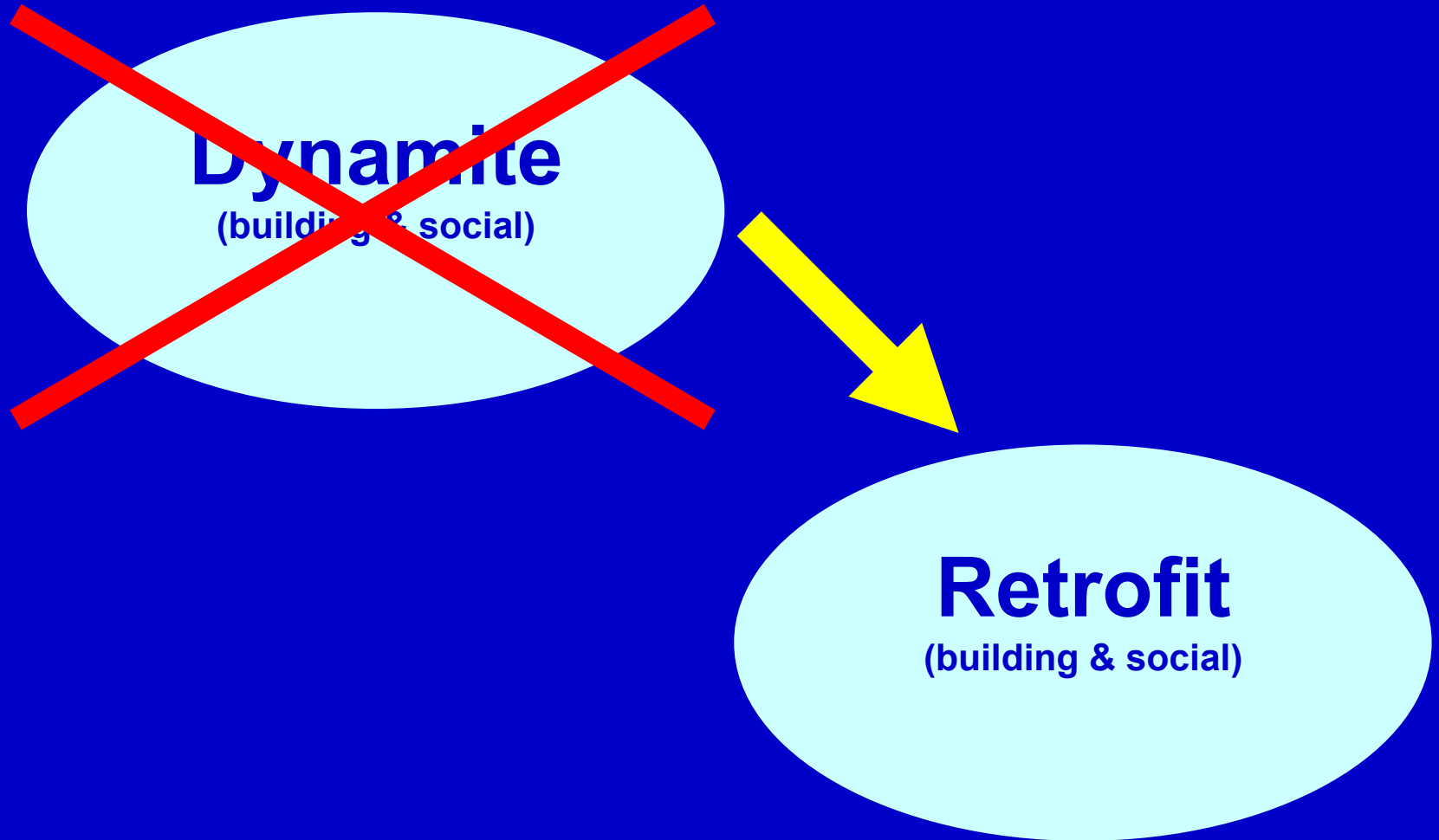
Current state



Current state



SOLANOVA – Preservation





SOLANOVA - Contact

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