



FH Salzburg

Life-Cycle Costs of a Minimally Invasive Refurbishment Approach in Comparison to a Standard Refurbishment

Daniel Heidenthaler | SBE19 Graz | 12.09.19

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Overview



- Project description
- Challenges
- Construction
- Methodology
- Life Cycle Cost
- Conclusion
- Outlook



Source: FH Salzburg

Project description



Refurbishment (and extension) of a residential building with a multifunctional façade

- Conservation of the existing building
- Tenants do not have to be resettled
- Prefabrication
- Newly developed facade system
 - Sound absorption
 - Insulation
 - Heating from outside



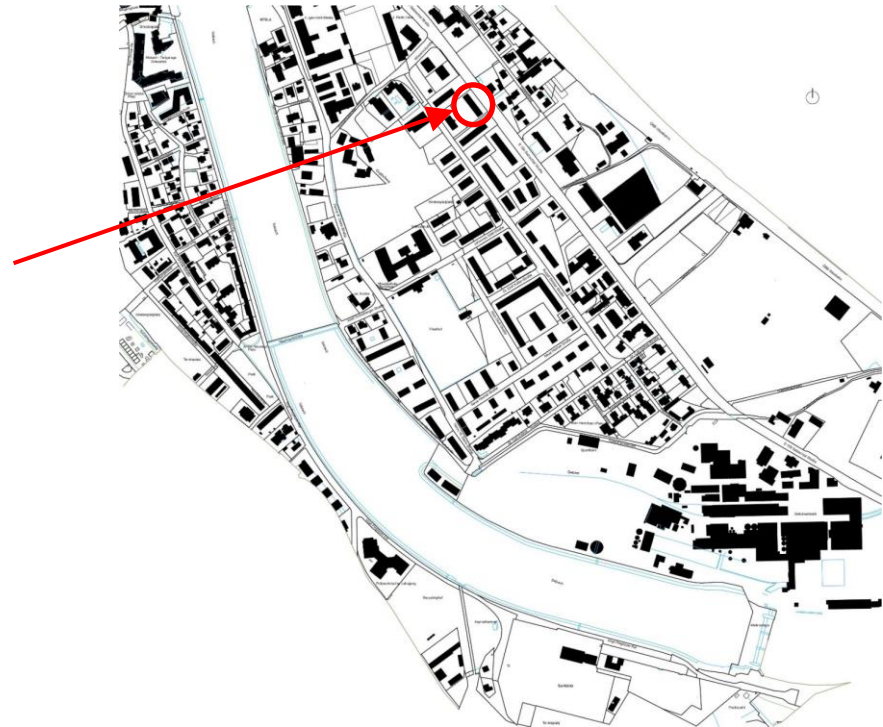
Source: FH Salzburg

Challenges



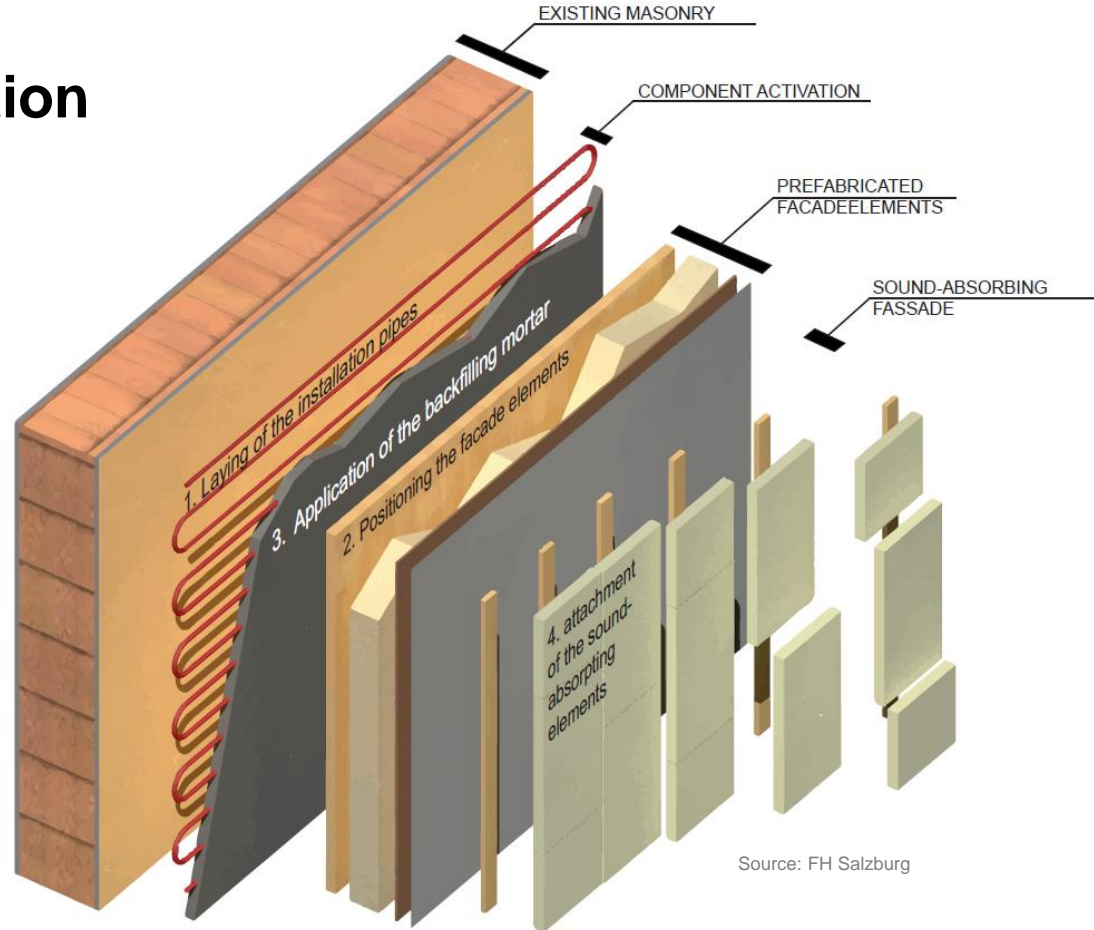
- Social housing
- Erected: 1950s
- Characteristics:
 - High traffic volume
 - Aging inhabitants (60+)
 - Lack of thermal insulation
 - Obsolete heating systems

➤ Refurbishment potential

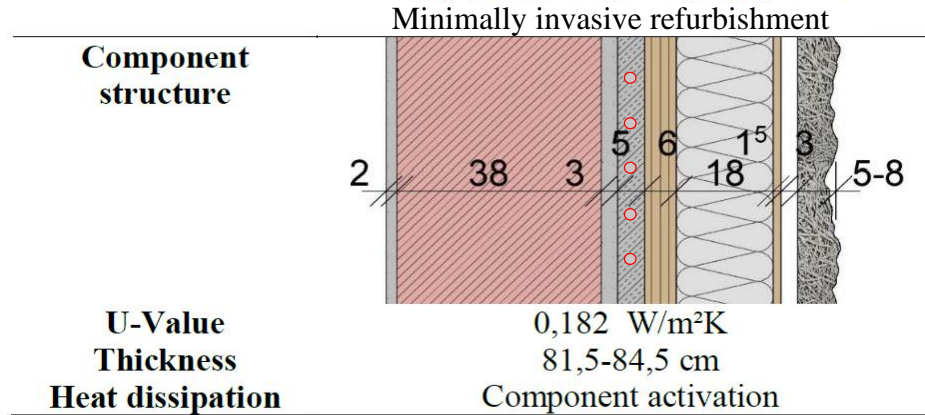


Source: FH Salzburg

Construction



Methodology



Methodology



Table 1. Comparison of the selected variants.

	Minimally invasive refurbishment	Standard refurbishment
Component structure		
U-Value	0,182 W/m ² K	0,182 W/m ² K
Thickness	81,5-84,5 cm	64,5 cm
Heat dissipation	Component activation	Radiator

Methodology



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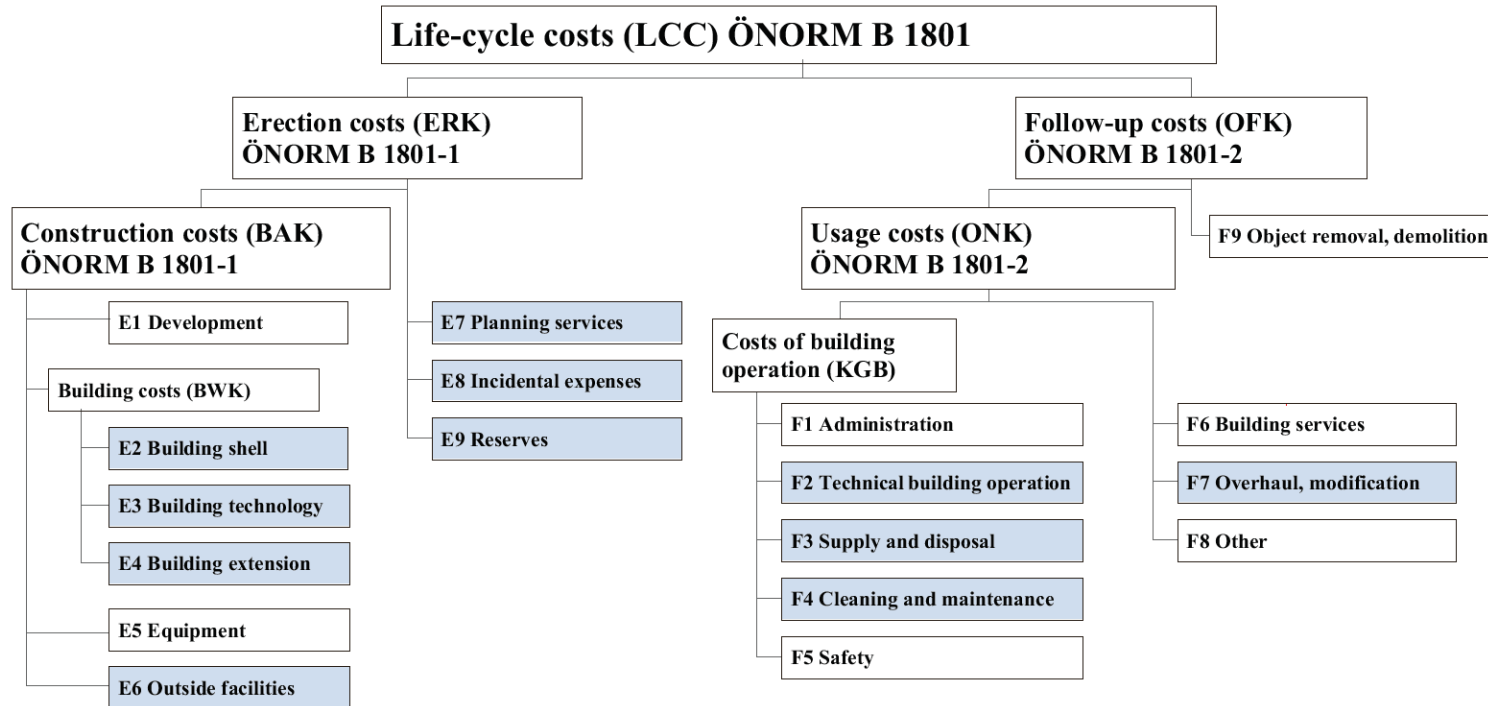
Data basis:

- Actual costs
- Obtained offers
- Estimated costs

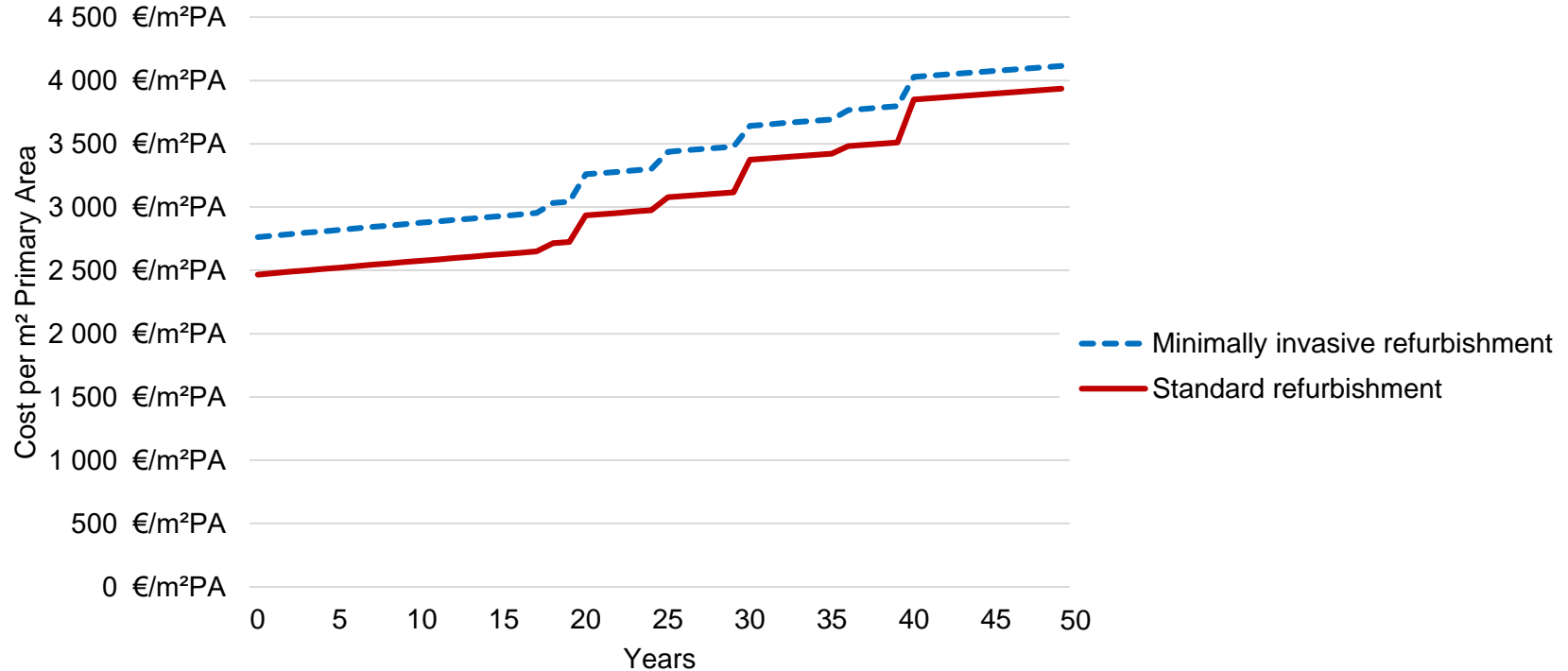
Tool Lekoecos:

- Danube University Krems, Helmut Floegl
- ÖNORM B 1801-1 & 2

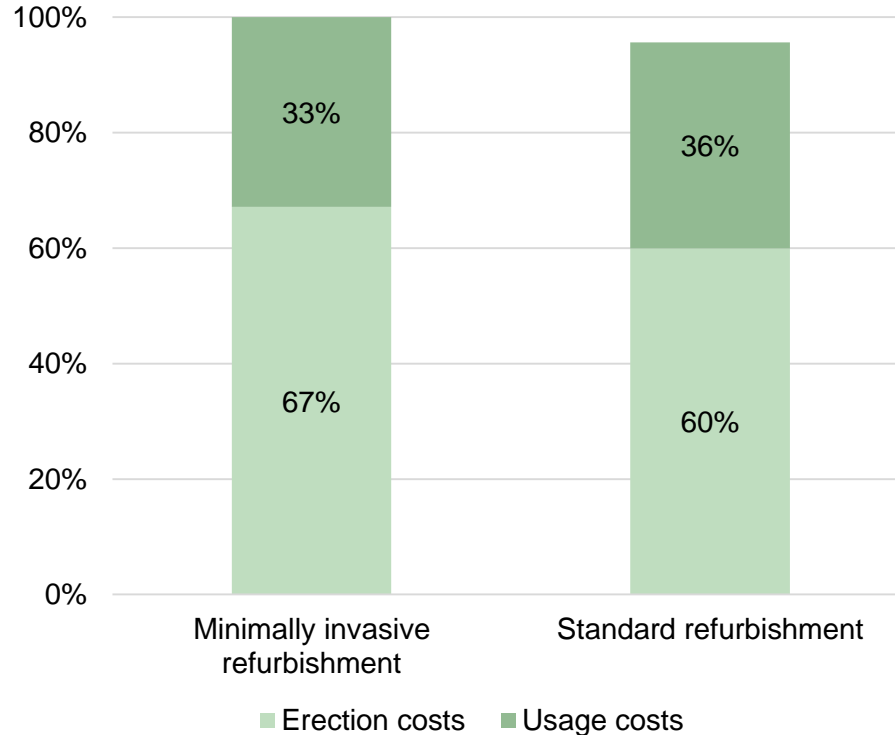
Methodology



Selected cost groups of Life Cycle Cost



Selected cost groups of Life Cycle Cost



- Erection costs: 7% gap
→ façade- and heating system (minimal invasive refurbishment)
- Usage costs: 3% gap
→ radiators and plastered façade (standard refurbishment)
- Total difference: 4%
→ **equal 36% according to the façade relevant costs**

Conclusion



Cost reduction necessary to become economically competitive

Non-monetary added value:

- Minimally invasive approach
- Heat dissipation
- Reduced use of floor space
- Sound absorption
- Wood-based materials



Source: FH Salzburg

Outlook



Cost reduction and further optimization:

- Building service system
- Façade construction
- Materials
- Control strategy



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