

# Towards a Holistic Approach to Retrofitting

## A Critical Review of State-of-the-art Evaluation Methodologies for Architectural Transformation

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A Critical Review of State-of-the-art Evaluation Methodologies for Architectural Transformation

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# Agenda

- Background
- Hypothesis
- Objective
- Methodology
- Findings/conclusion
- Further studies



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# Background

- The building sector accounts for up to 40 % of the total energy consumption in the EU.
- The majority of the existing building mass will still be in operation by 2050.
- **=> a considerable potential in renovation of existing buildings.** Especially in the domain of social housing.

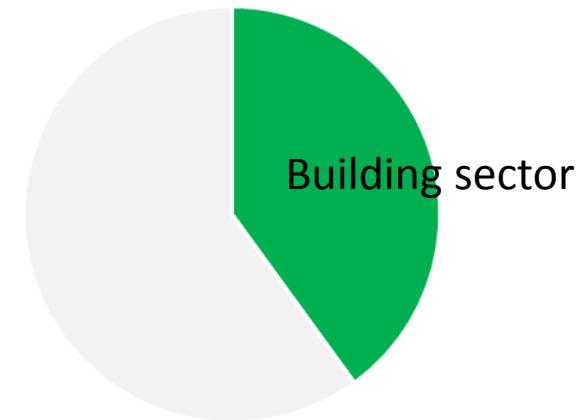
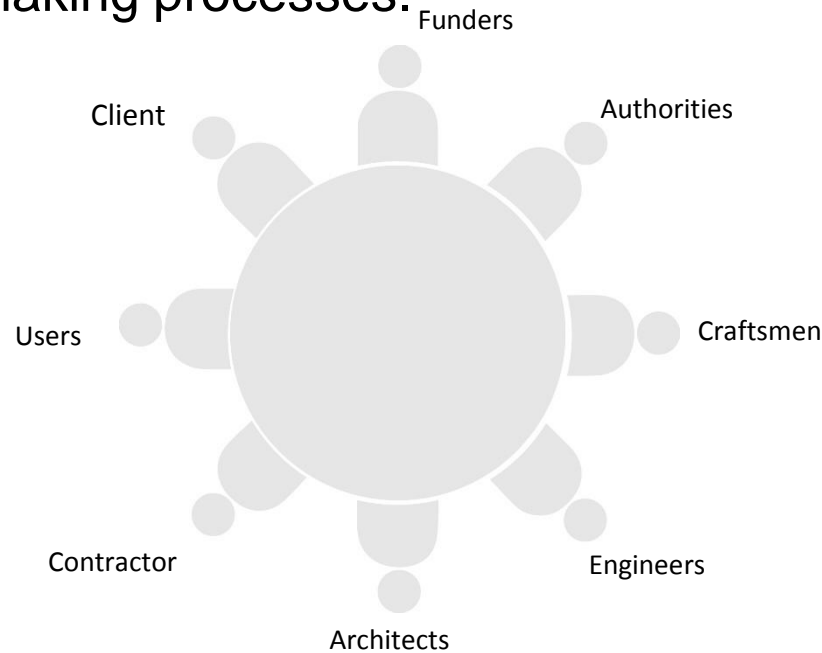


Fig. 1: Energy consumption in the EU.

# Background

- Renovation projects make up highly complex systems with many stakeholders.
- => Development of a number of assessment methodologies to assist the decision-making processes.



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# Hypothesis

- A. That the methodologies assign weight to different 'sustainability indicators' and, as such, represent different views on sustainability.
- B. That there is a gap in the existing tools, when it comes to addressing the implications of technical interventions on socio-cultural themes (perceived spatial quality) in early design stages.



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# Objective

- Qualitative analysis of 7 state-of-the-art methodologies for sustainable renovation.



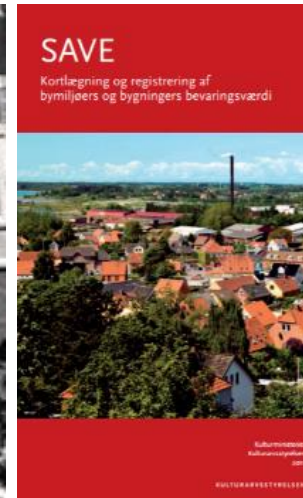
aktivhus

Evaluering af kvalitet i boligbebyggelser

vejledning for byggeriets parter



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# Methodology

- Allocating the themes of the methodologies to the traditional 3-pillar understanding of sustainability.



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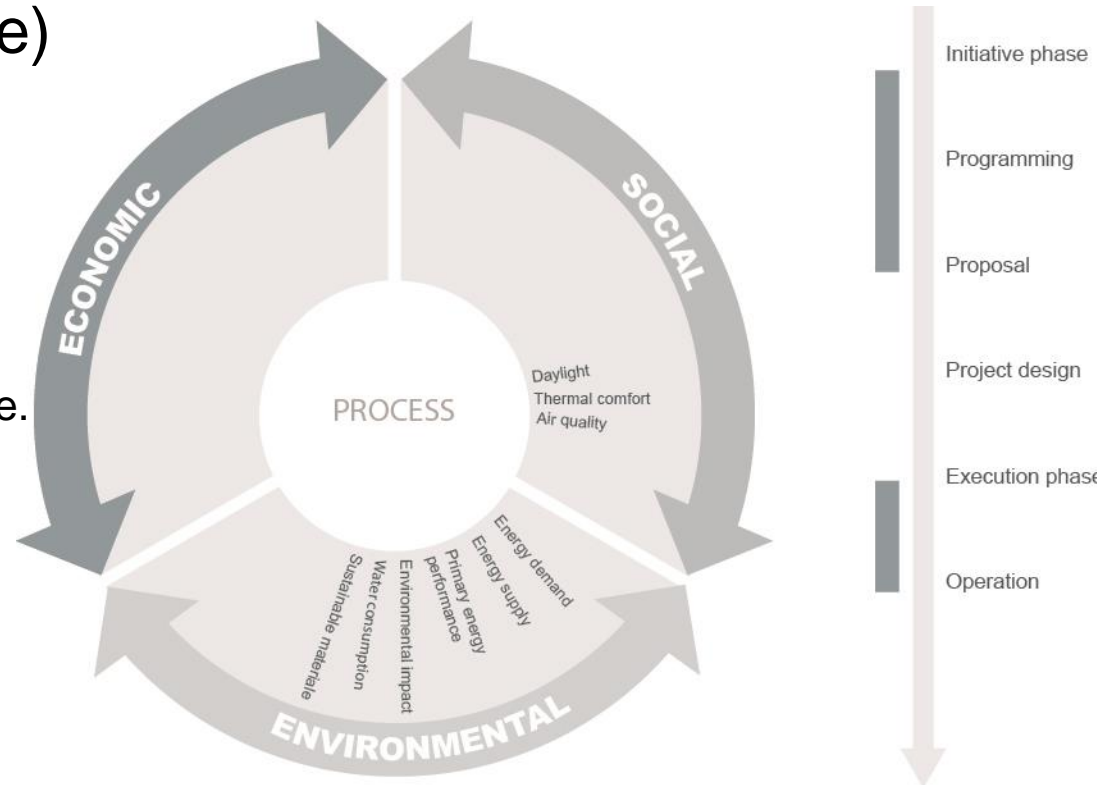


# Findings



- AktivHus (ActiveHouse)

- From 2015, based on the international ActiveHouse principles.
- Design strategy and certification tool.
- Focus on environmental indicators and indoor climate.



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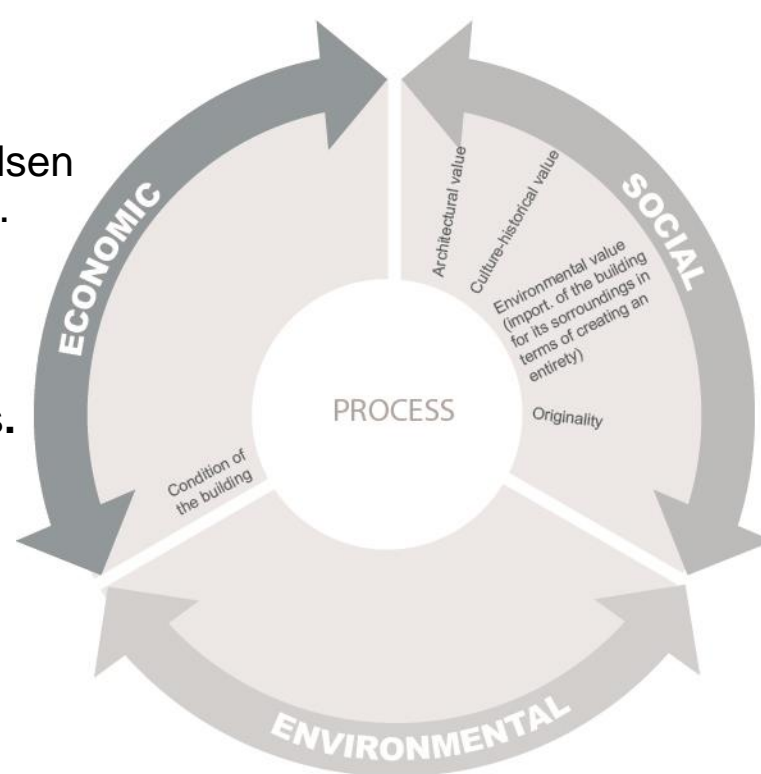
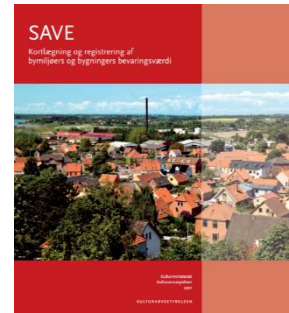
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# Findings

- **SAVE**

- Late 1980's.
- Administered by Kulturstyrelsen (Danish Agency for Culture).
- Asses preservation value of existing buildings.
- Preservation tool => Focus on culture-historical aspects.



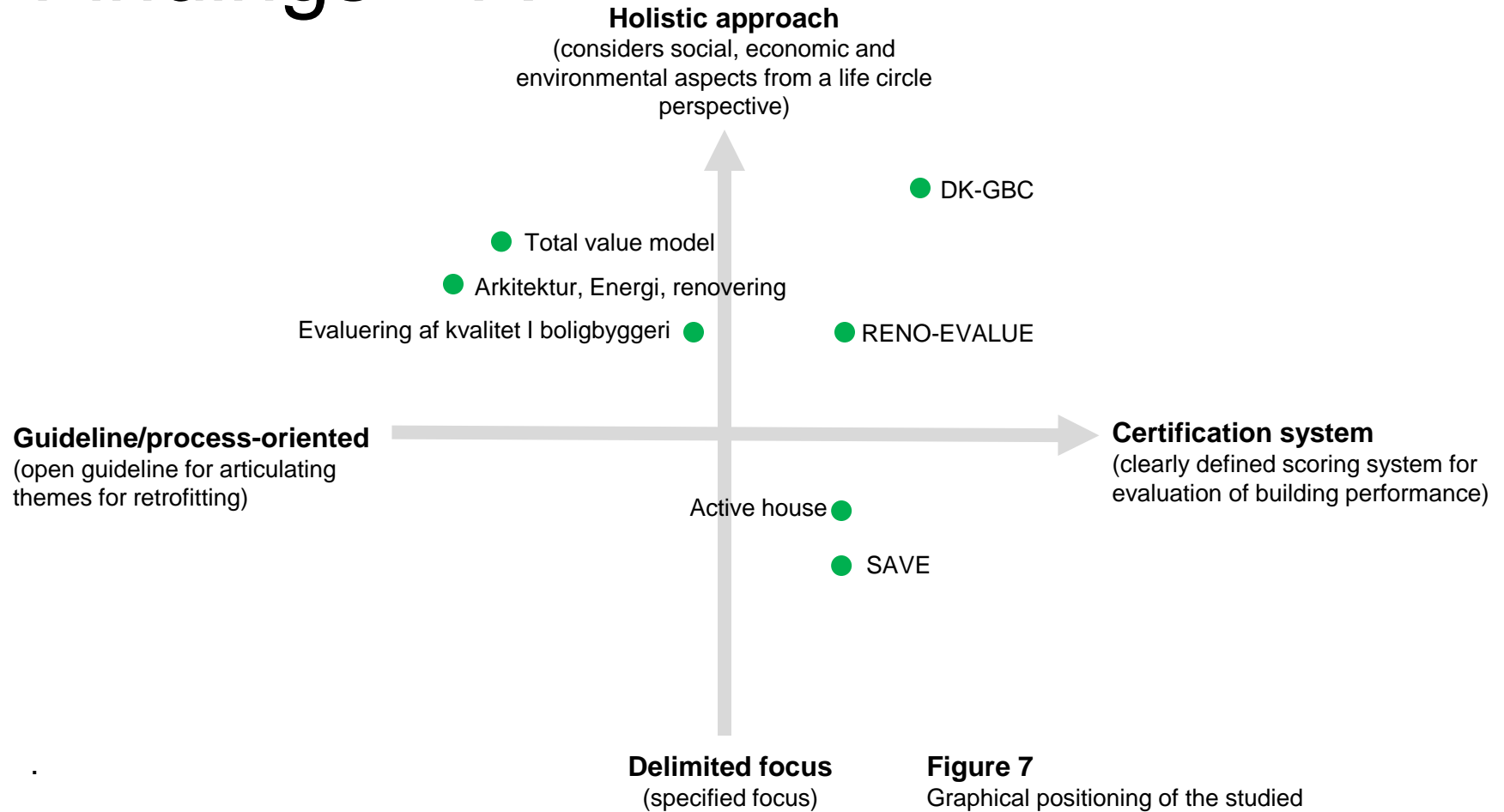
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# Findings – A



**Figure 7**  
Graphical positioning of the studied methodologies for sustainable retrofitting

# Findings – B

B. We see a general challenge in the methodologies when it comes to addressing the **spatial consequences** of technical initiatives in the early phases of a renovation process.

- **Energy renovations drastically affect the built environment** (Hvejsel et al, 2015) (Acre & Wyckman, 2015) (Beim & Madsen, 2015).
- Represents a **lost opportunity to increase the inhabitant's receptiveness** (Acre & Wyckman, 2015).
- The 'soft' character of spatial quality is difficult to quantify and 'operationalize'.

## Quantitative aspects

Measurable aspects (e.g. economy, energy, indoor climate)

## Qualitative aspects

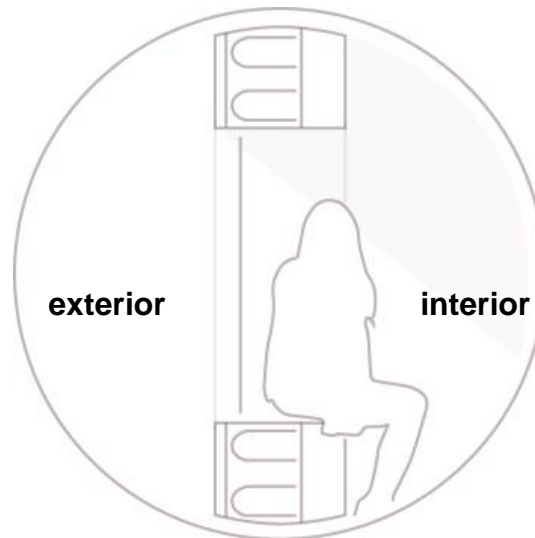
Culture-social aspects (e.g. spatial quality)



# Further studies

## – architectural transformation

- Further studies into the consequences of energy optimization initiatives on the perceived spatial quality



# Further studies

## – architectural transformation

- Further studies into the consequences of energy optimization initiatives on the perceived spatial quality
- Case: social housing renovation in Aarhus, Denmark.



Image:  
Toveshøj, Denmark.



# Further studies – architectural transformation

interviews  
inhabitants

literature  
studies



RtD  
practicing  
architects

Image:  
Toveshøj, Denmark.



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# Thank you

WSBE17 | 5-7 June 2017 | Hong Kong

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