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Uncertain future - How does different ways to estimate the heat demand in retrofitted buildings affect District Heating owners?

Knut Bernotat

Department of Industrial Economics
Royal Institute of Technology
Stockholm, Sweden
++ 46 (0)8-790 9663
Knut@kth.se
<http://www.indek.kth.se>



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Overview

- Introduction
- The Swedish housing system
- Task
- Performance of buildings
- Conclusions



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Introduction

- European energy consumption in the building sector accounts for approximately 40% of the European total energy consumption and is the main contributor to greenhouse gas (GHG) emissions.
- A large share of the building stock is older than 50 years and needs to be renovated and retrofitted.
- Only 1-2 % are retrofitted annually
- Long transition period



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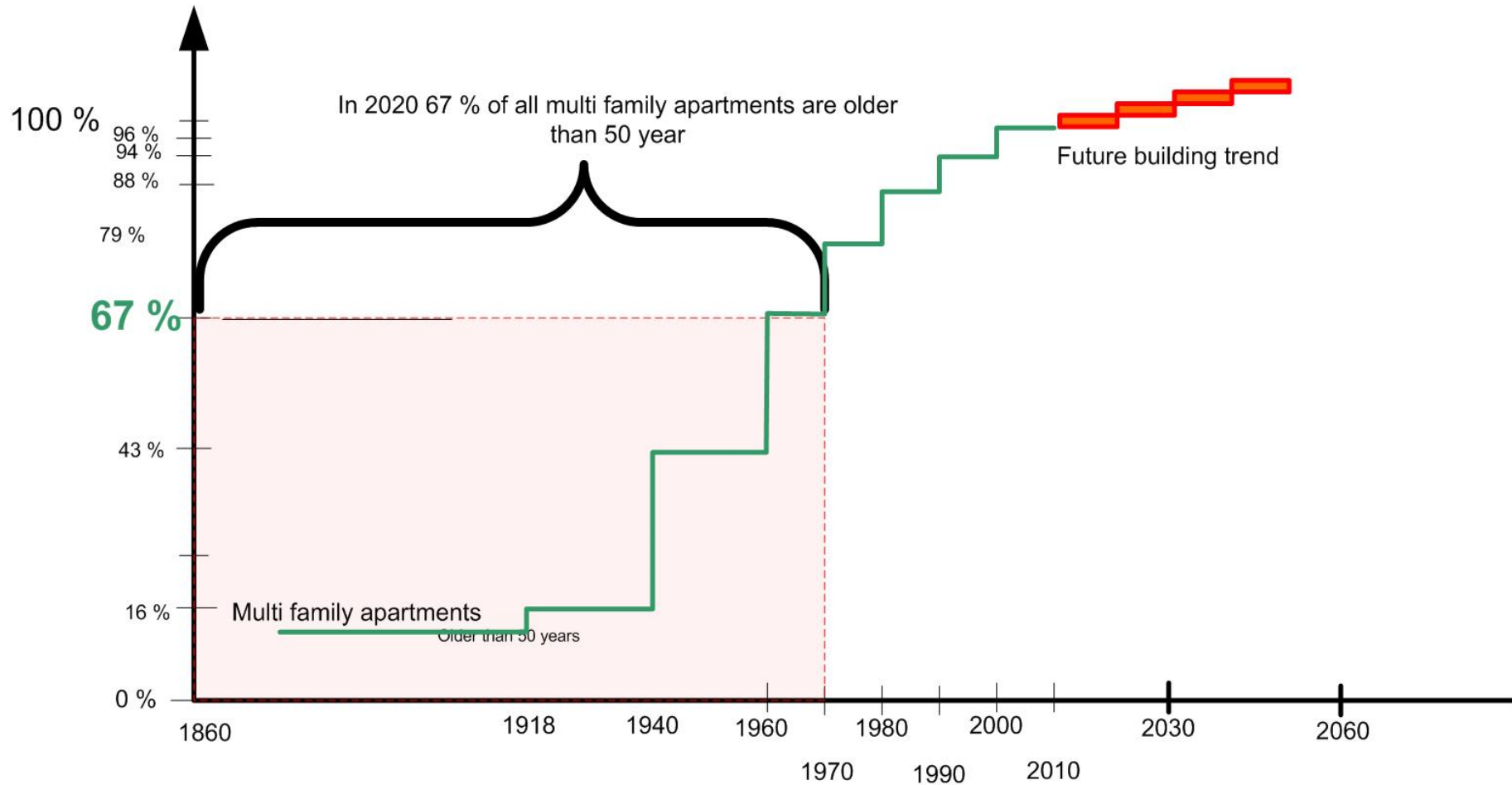
Example: The Swedish housing system

- Only 12% of the single houses have DH
- The majority of single houses has electrical heating
- 90% of the multi dwelling apartments are heated by District Heating (DH)
 - Heat included rents
 - Tenants lack heat cost sensibility
 - Tenants have no knowledge on their resource allocation and heating cost.
 - No incentive to save energy



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The Swedish MDA building stock





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The Swedish renting system

- The landlord has a conflict of interest.
- His economic goal is to minimize costs and maximize profit.
 - Reducing the temperature,
 - Adjusted indoor temperature of 20 C°
 - Stripping the heat volume delivered to the apartments
 - Delaying heat supply -reducing the supplied energy.
- Taking the tenants freedom to choose its own room temperature



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Task

- **Keeping track of regional heat demands while reducing the energy demand in the building sector in the short and long run**
- **Identifying the underlying barriers**



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- **Old building stock which needs to be renovated and retrofitted**
- **Individual behaviour and energy consumption**
 - Large differences in energy consumption in identical houses or apartments.
 - Many more aspects than payback time have to be considered to understand renovation patterns of house owners
 - not only purely economic rationality



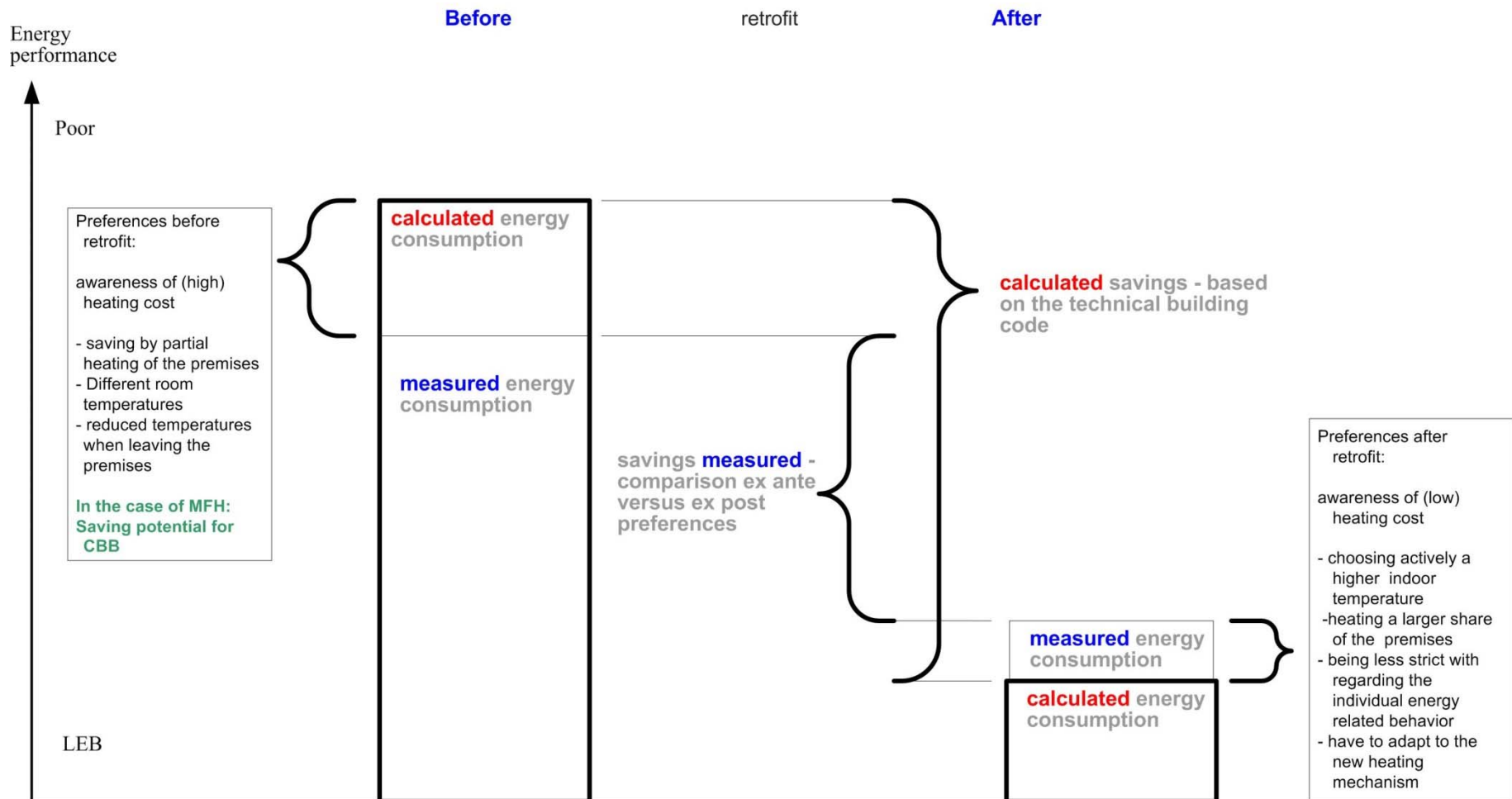
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The performance of buildings can be estimated by two different methods caused by different missions

- **The calculated energy demand (CED)**
 - applying the technical building standard and its energy use based on the building thermal conditions code when the building was planned and build
- **The measured energy consumption (MEC)**
 - of the last one to three years giving a picture of buildings current heat demand depending on its current use, tenant behaviour and legal framework



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Conclusions

- **The buildings sector energy consumption has many aspects to consider**
- **Individual preferences are not static as the before and after retrofit measured consumption prove**
- **The dynamic of the individual behavior should not be neglected**