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Policy and guidelines for energy effiency in cultural heritage buildings before 1945 in Sweden

Petra Eriksson, Conservation, Gotland University

Some things to talk about

- Conservation at Gotland University
- The research program ”Spara och bevara”
- Challenges and needs
- Learning from history
- Potential and Policy
  - Finding a method

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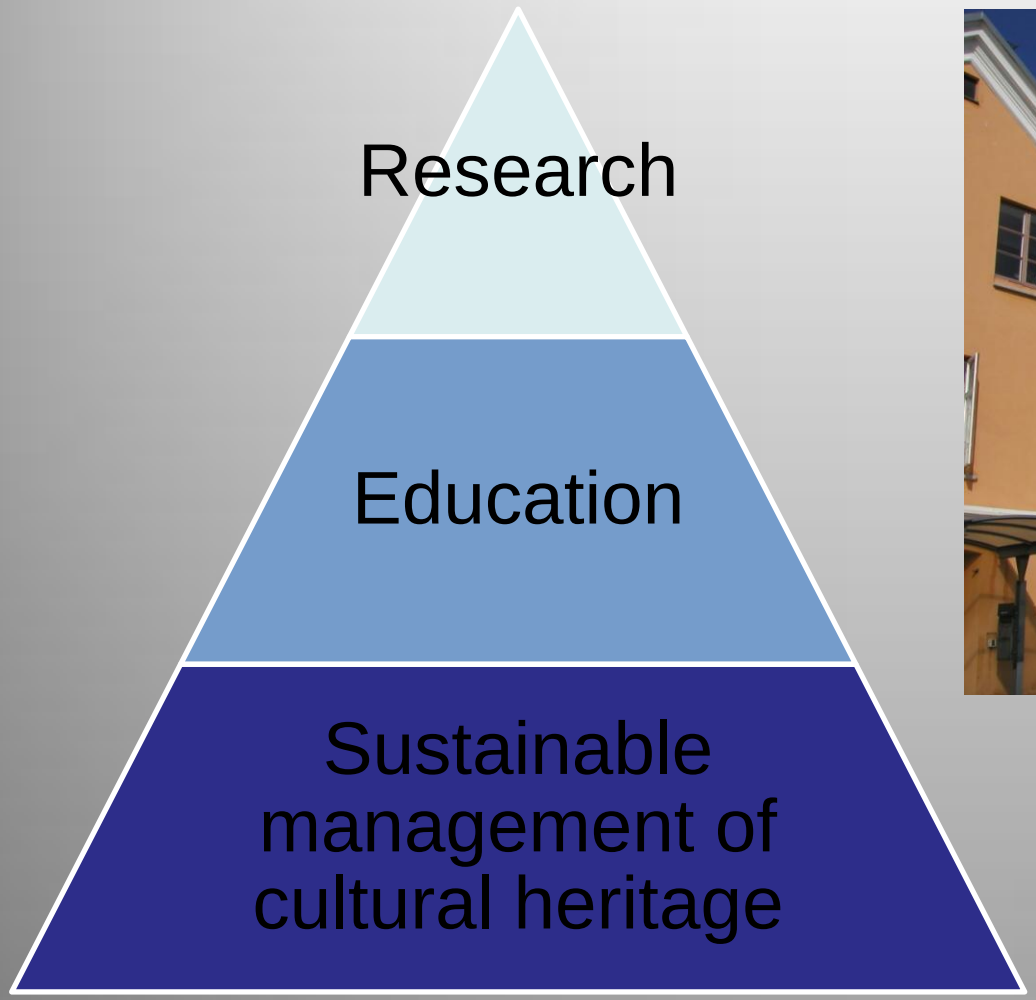
Conservation at Gotland University



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Conservation at Gotland University

- Bachelor programs in conservation
  - Building Conservation Programme
  - Objects Antiquarian Programme
- Master program in conservation
  - Sustainable Management of Cultural Heritage
- Courses in conservation

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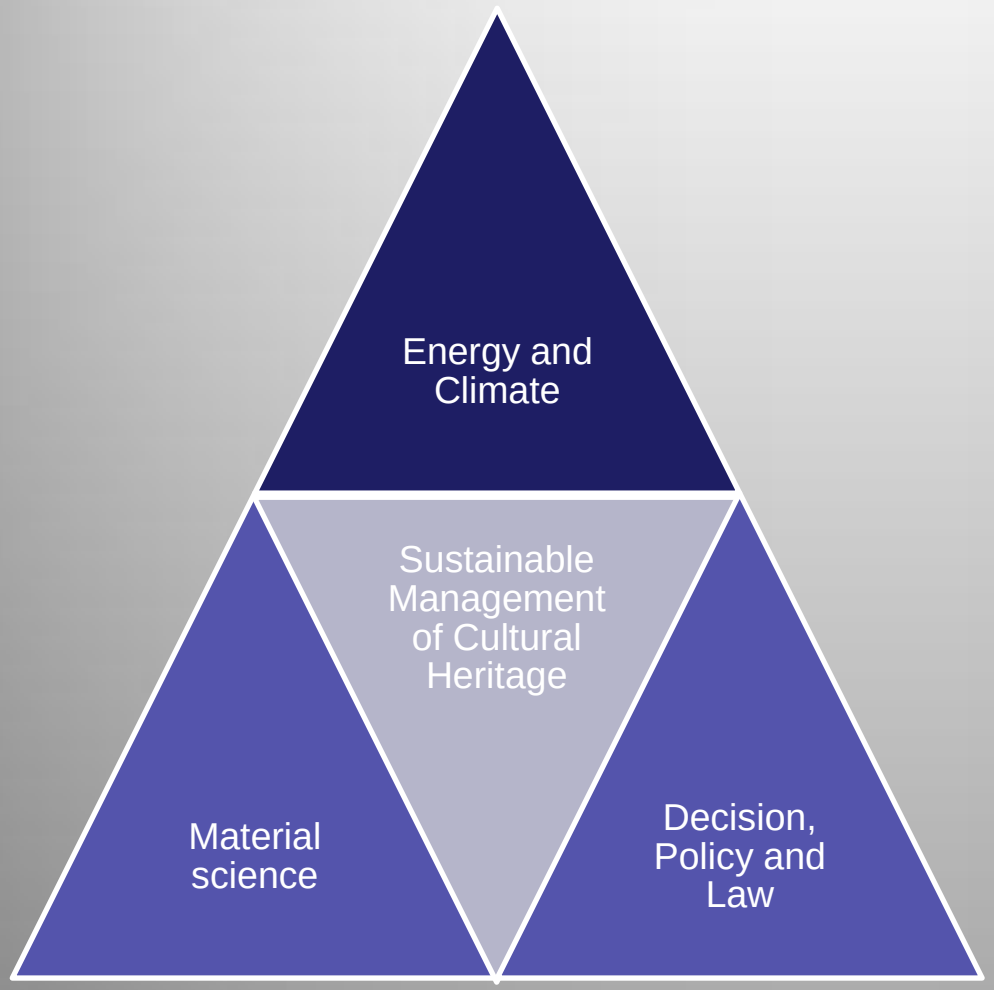
Conservation at Gotland University



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Spara och Bevara – ”Save and Preserve”

Research and development programme for energy efficiency in historic buildings funded by the Swedish Energy Agency.

Energy Efficiency and Preventive Conservation through Climate Control
Gotland University, Gothenburg University and the Royal Technical University
Centre for energy efficiency in historical buildings
Gotland University
Potential and policies for energyefficiency in buildings built before 1945.
Gotland University, Linköpings University, SP Technical Research Institute of Sweden
A historical perspective on energy efficiency in buildings.
Gotland University
Energy savings in churches: Ventilation and Air Movements.
Gävle University

Swedish Energy Agency

www.sparaochbevara.se

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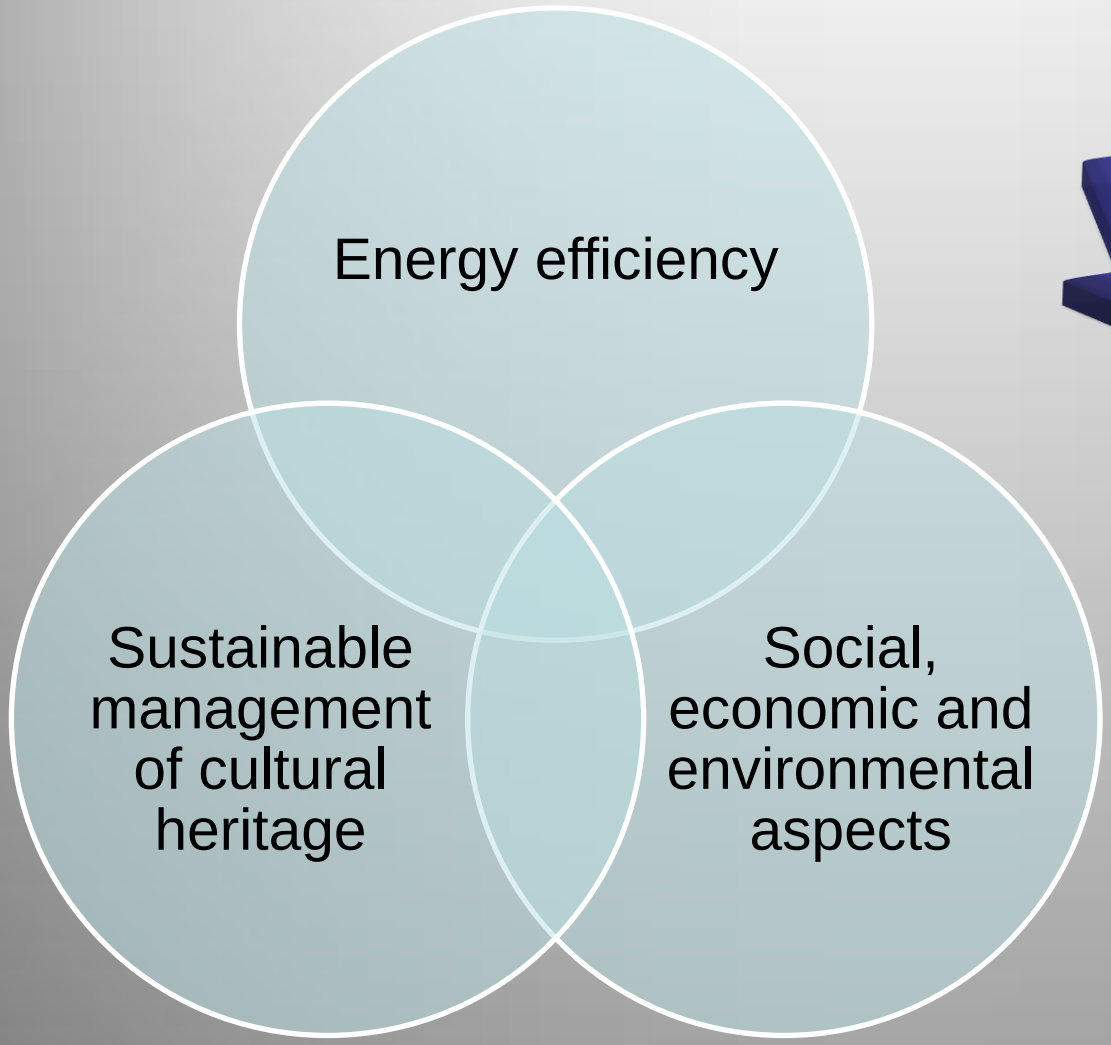
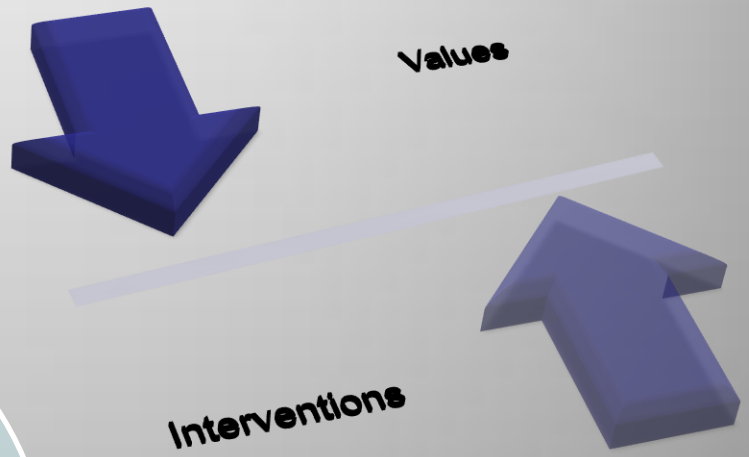
Challenges and needs





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Challenges and needs

Learning from history

Possibilities

Consequences

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Learning from history

Possibilities

Risks?

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Potential and Policies in buildings built before 1945

The main objectives of the project:

Investigate the relations between energy saving potentials and the impact on cultural significance (cultural heritage values) in vernacular buildings.

To define the needs of policies, information and solutions in order to meet the challenges of a sustainable management for the built heritage.

To investigate the possibilities to convert knowledge and experience from the development in the modern building industry regarding energy efficiency to solutions in older buildings.

Swedish Energy Agency

SP your Science Partner

Linköpings Universitet Tekniska Högskolan

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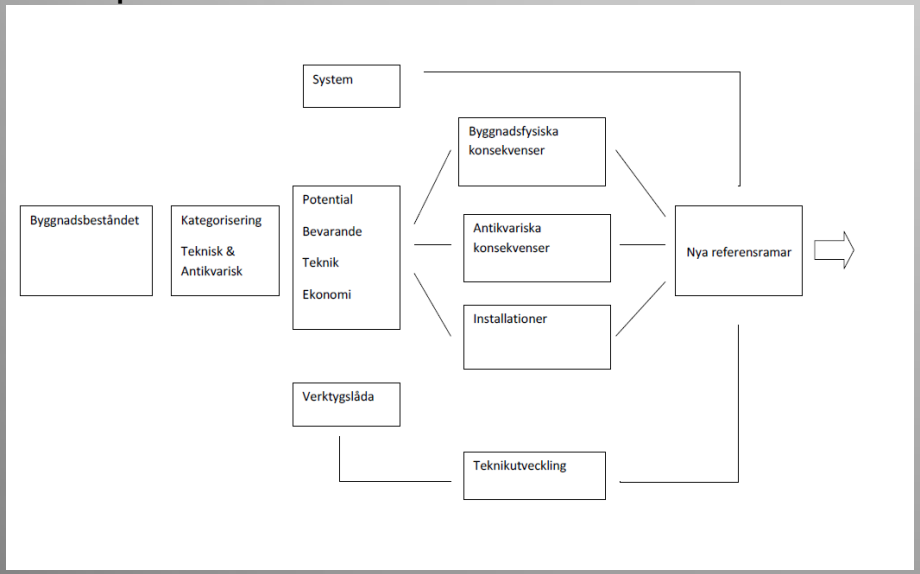
Development of Methods

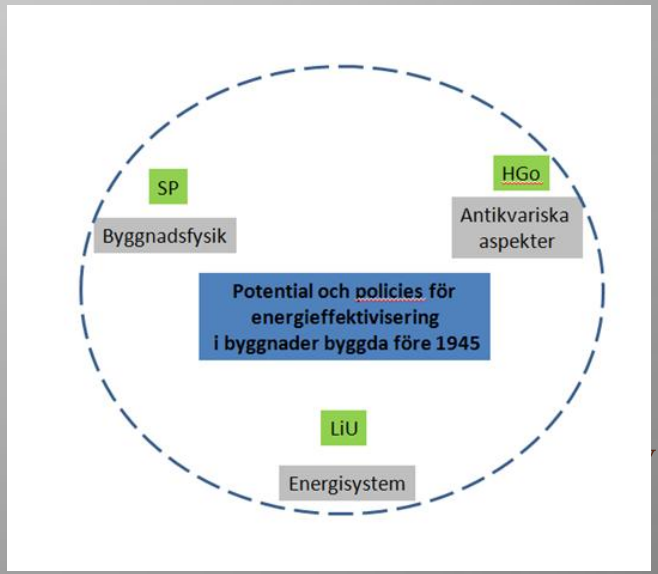
A categorization of the building stock based on statistical methods

Defining future scenarios based on national targets for energy performance as well as for preservation of the built heritage.

A broad assessment of risks and benefits associated with a gross list interventions for energy efficiency

For each building category and each scenario an optimization is carried out with respect to all aspects of sustainability seeking to exclude bad solutions and defining a range of acceptable solutions.





Categorization

Indicators
Heritage values

Scenarios

Assessement of interventions

Optimization

Factors

- Age
- Climate and/or regional zone
- Construction
- Materials
- Use

Studies

- National databases
- Regional studies

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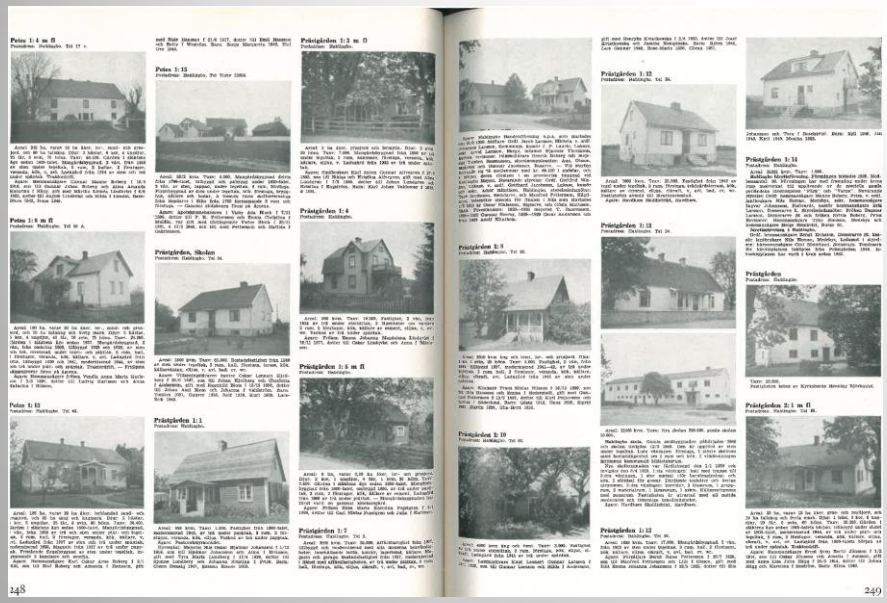

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249

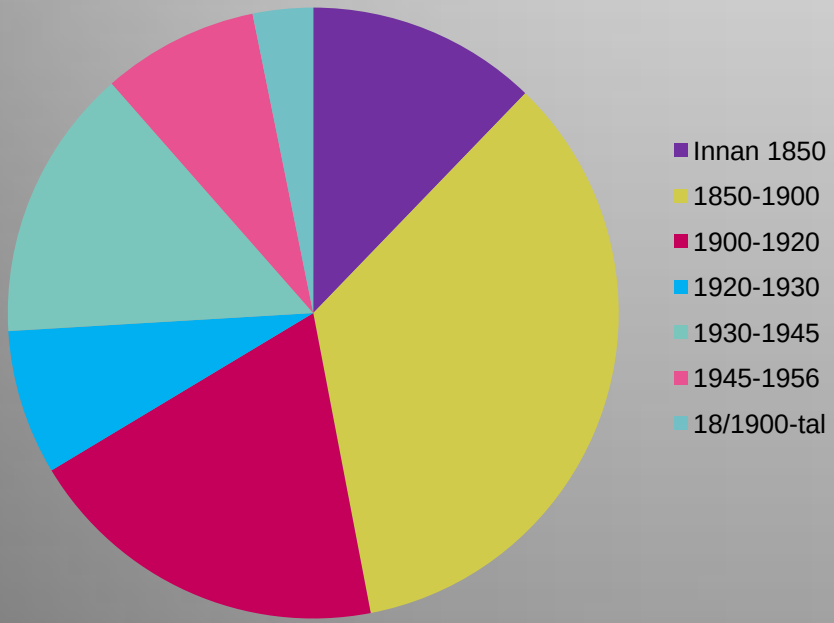
Petes 1: 15
Postadress: Hablingbo. Tel Visby 10804.

Areal: 3512 kvm. Taxv: 6.000. Mangårdsbyggnad delvis från 1790-talet, tillbyggd och påbyggd under 1820-talet, 3 vån, av sten, rappad, under tegeltak, 6 rum, förstuga. Flygelbyggnad av sten under tegeltak, kök, förstuga, brygghus, källare och bodar. A tomten finns skiftesverkshus från Hegdarve i Silte från 1760 inrymmande 3 rum och förstuga. — Gammal stolpkvarn finns på ägorna.

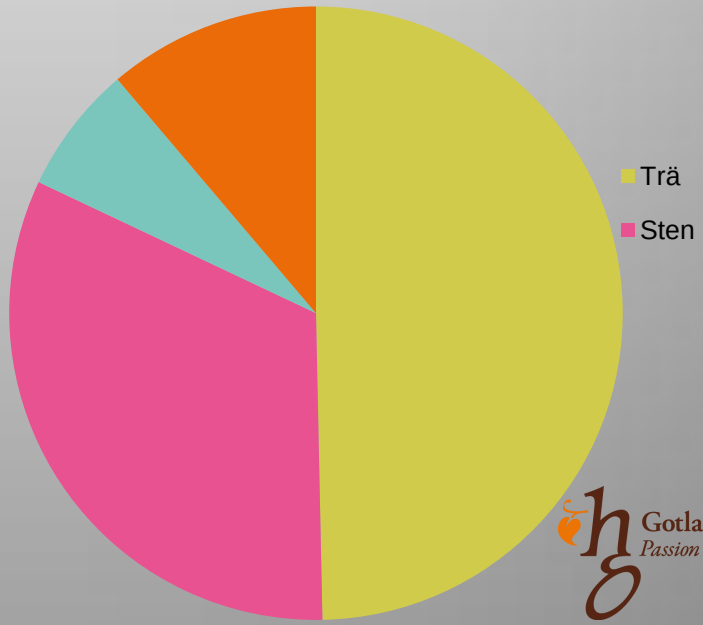
Ägare: Apoteksinnehavaren i Visby Ada Block f 7/11 1895, dotter till P. R. Pettersson och Emma Christina f Muldin, var gift med civilingenlör Victor Block f 29/11 1891, d 17/3 1945, son till Axel Pettersson och Matilda f Gabrielsson.

Age
Material
Construction
Rooms

Age



Material/Construction



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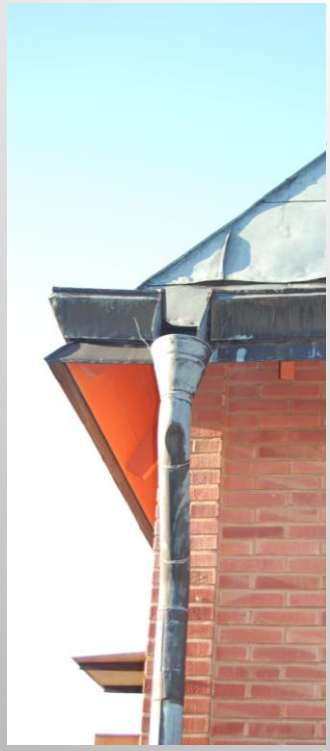

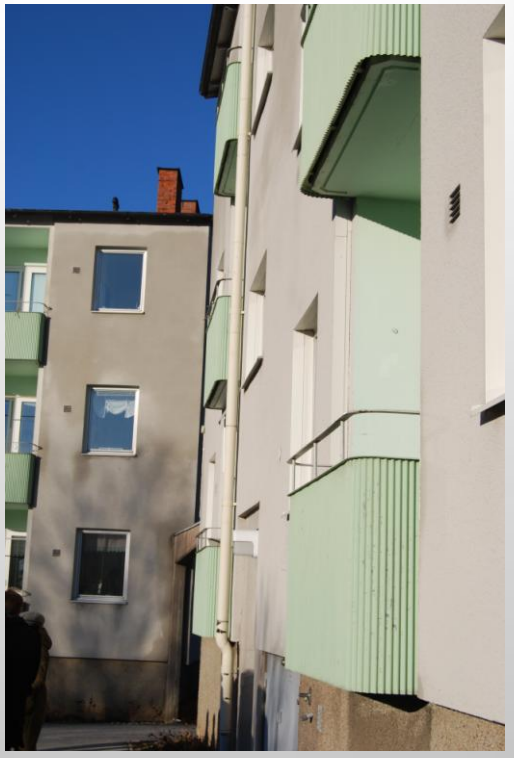

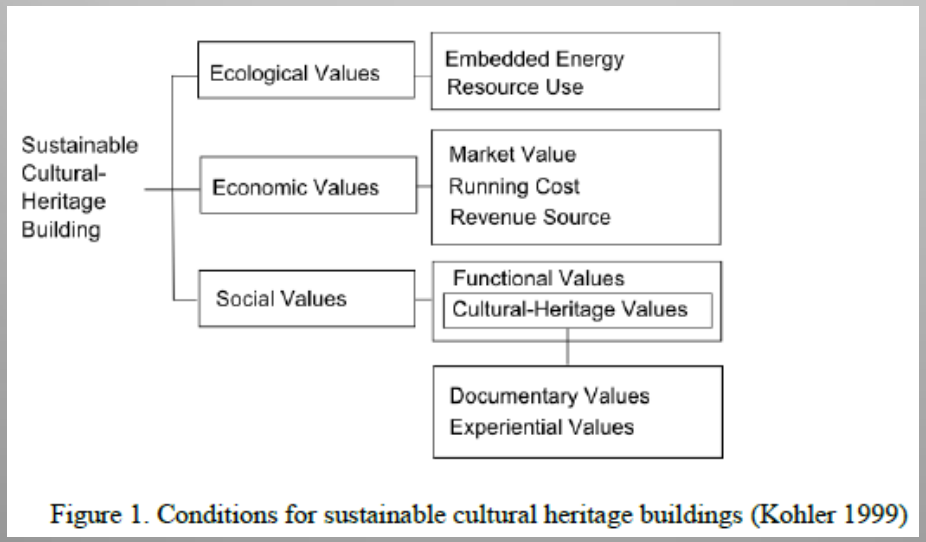

Figure 1. Conditions for sustainable cultural heritage buildings (Kohler 1999)

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Where to start?

Interventions

Buildings

Values

Buildings

Values

Interventions

Values

Interventions

Buildings

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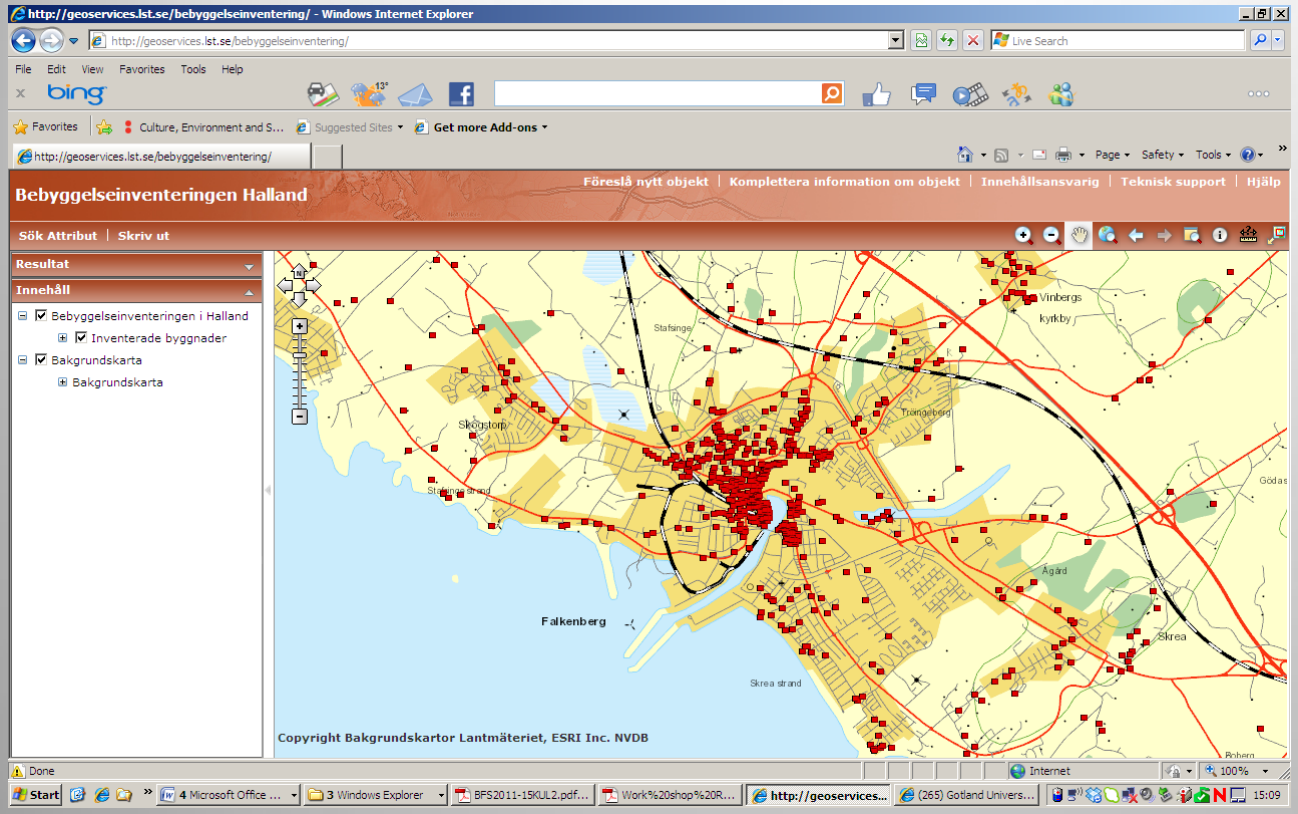

Few regions in Sweden had pointed out buildings or groups of buildings with special cultural heritage values.

The region of Halland has pointed out ca 10 000 buildings and divided them into three classes.

www.lst.se

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Categorization

Indicators
Heritage values

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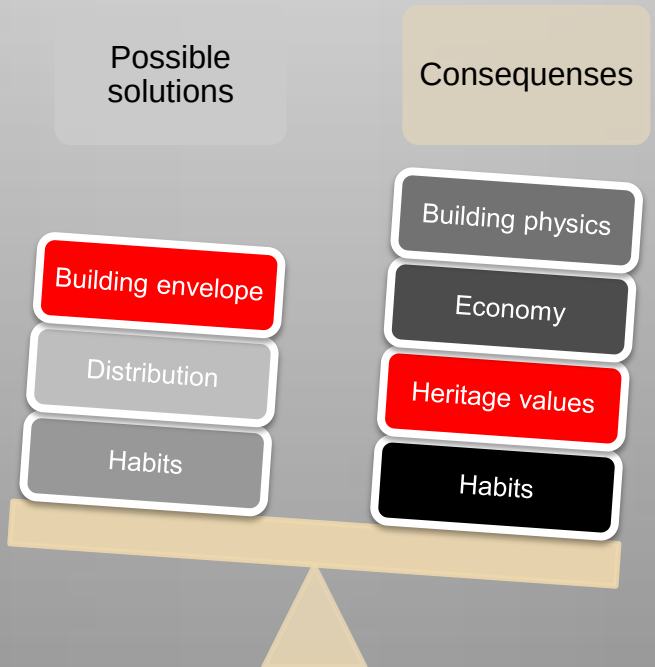
Assessement of interventions

Optimization

Targets for scenarios

- Base line – present state
- National policies for energy savings
  - 20% by 2020
  - 50% by 2050
- National policies for preservation and management of heritage values.
  - According to Swedish laws and practise
  - Strict interpretation
- Optimal cost – benefit
  - Energy saved in relation to risks and costs including heritage values



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Categorization

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Building envelope
Heating systems

- Energy savings
- Economy
- Environment
- Heritage values
- Reversability
- Durability
- Effects on building performance
- Indoor environment and comfort

Categorization

Indicators
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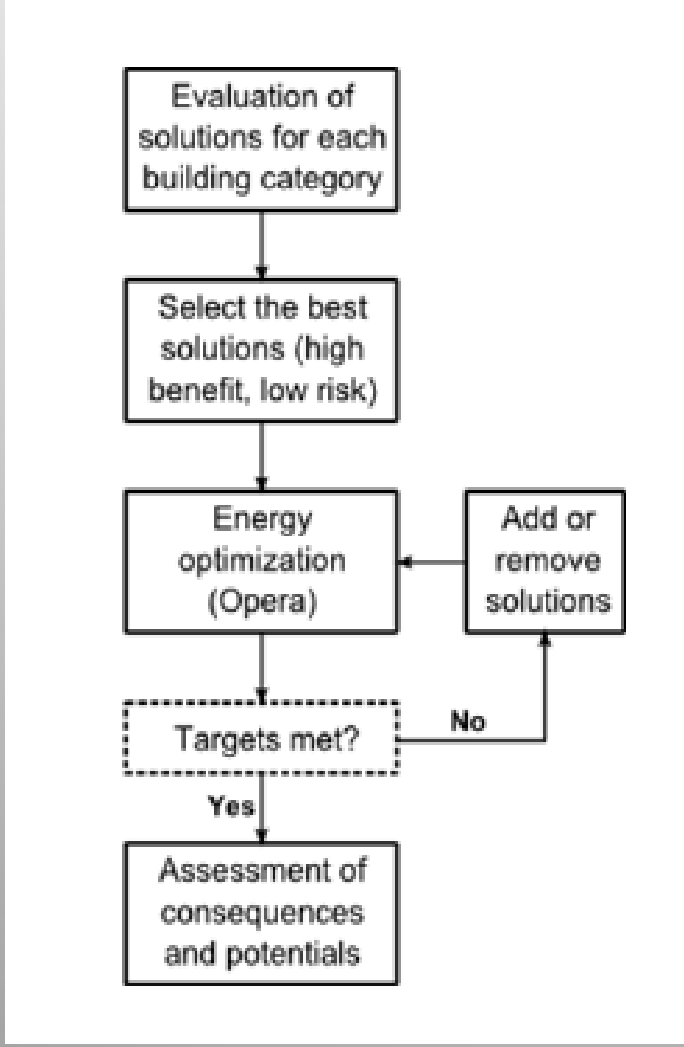

By the nature of the problem, the optimization process will not converge to an objective and quantifiable optimum.

The proposed methodology should be seen rather as a tool for parameter studies.

High effect – low risk

Low effect – high risk

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Expected results

- Tools for consequense- and vulnerability analysis
- Scientific contributions
- Handbooks /guidelines

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Thank You for listening

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”We have no right whatever to touch them. They are not ours.
They belong partly to those who built them and partly to all the generations of mankind who are to follow us.”
Ruskin 1849

”Do as much as necessary but as little as possibly.”
The Burra Charter, 1999

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