



Subject

Due to climate change our carbon dioxide emissions must be reduced and energy saving is needed. Housing associations own a large number of houses, renovate large scale projects and can accelerate energy reduction. Housing associations have a positive attitude towards energy efficient renovations, yet experience a threshold applying them because of a lack of knowledge.

Goal

Develop methods and software to support housing associations in choosing the optimal renovation solution for a district.

Expected Results

An energy and comfort performance calculation method for comparing urban design options. A district model to store all the needed information for the calculations. The developed techniques are combined in a prototype support tool for housing associations.

District Renovation Design Support based on Energy consumption and Resident's Preferences

Rona Vreenegoor¹, Bauke de Vries², Jan Hensen³

¹ PhD Researcher, Design and Decision Support Systems, r.c.p.vreenegoor@tue.nl

² First promoter, Design and Decision Support Systems, b.d.vries@tue.nl

³ Second promoter, Buildings Physics and Systems, j.i.m.hensen@tue.nl
Eindhoven University of Technology, Architecture building and planning



Subject

Due to climate change our carbon dioxide emissions must be reduced and energy saving is needed. The largest energy savings are feasible in the existing building stock. Housing associations own a large number of houses and renovate large scale projects. They can accelerate energy reduction in the existing building stock. Housing associations have a positive attitude towards energy efficient renovations, yet experience a threshold applying them because of a lack of knowledge.

Goals

The aim of this research is to develop methods and software to support housing associations in choosing the optimal renovation solution for a district.

Research Question

Can the developed methods and software support housing associations in choosing the optimal renovation solution for a district with optimal energy results and acceptance by the residents?

Strategy

To fulfil the aim, a prototype energy simulation and residents' preferences evaluation system will be implemented and tested. The following techniques will be used to develop this prototype:

1. energy and comfort performance calculation method at district level, based on existing methods (mostly at building level) like EPA, EPN, EPL;
2. district model based on existing building models like IFC, Het Digitale Huis;
3. method to measure residents' preferences based on existing methods like semantic differentials, conjoint analysis;
4. optimization technique to combine the energy and comfort results with the residents' preferences based on existing techniques like for instance artificial intelligence.

Expected Results and Deliverables

An energy and comfort performance calculation method for comparing urban design options. A district model to store all the needed information for the calculations. The developed techniques are combined in a prototype renovation support tool for housing associations.

Preferred Partners Applications / Sponsors

Housing associations, energy supply companies, property developers.

Prime Publication / Prototyping

The prototype will be used and tested in at least one large scale renovation project provided by a housing association.

Research Period

2007 - 2011