

Efficient Housing Renovation.

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Introduction

A house is a place for people, and people expect this place to be safe, healthy and comfortable. Energy is needed to make a house function as a system and make a house a home for its occupants. The amount of energy is considerable regarding the total energy consumption in the Netherlands. It is estimated that some 17% of the overall national energy consumption is being used by households. Almost all the energy used in housing is of fossil origin. (natural gas for heating, coal and natural gas for electricity)

In new housing the energy consumption can be significantly reduced. However only some 60,000 new houses are being built in the Netherlands (2008), regarding the total housing stock of approximately 7,000,000 houses, the new built houses will offer only a slight contribution in reducing the national energy consumption.

It is estimated that the cost of housing in the Netherlands consists on averages some 27% of the total family budget. [ECHP, 2009] Compared to other European countries this is amongst the highest figures. It can be concluded that a general need for low cost housing exists.

A great number of the existing Dutch housing stock consists of outdated post World War II row housing. Many of the houses that have been built in the 1945-1975 period and are nowadays considered outdated. These houses are considered too small, too high energy consumers and are consequently possibly facing demolition.

Analyses

A great many housing renovation concepts exist. Unfortunately in the practical action of renovation the activities are often limited when occupants are to stay in their homes. For extensive renovation the occupants have to leave for a period of time varying from two week to several months with related discomfort and cost. The focus of this research is a renovation method enabling the occupants to stay in their homes and experiencing only limited discomfort but yet with an individual high level renovation as a result.

In this research the characteristics of both postwar and new housing is analyzed regarding building technology, comfort and energy consumption. Three reference projects in various places and time are analyzed (Schiedam Kristinsson, 1983, Amersfoort, Energiebalans woning 1997, and Lindås, Houses without a heating system, Goteborg, Sweden 2001). Also the german passivehouse concept is analysed and adapted to the Dutch cultural situation. [www.passivhaus.de]

Methodology

The methodologies used in this research are the Systems Analyses combined with literature survey and the interviewing of professionals. The modeling will be done using the DEROB LTH program (Sweden) and the HAM base program as developed at the TU/e. Both results will be compared and differences are to be analyzed.

The options for the application of sustainable energy aspects like active and passive and thermal and photo voltaic will be analyzed in relation to the building technology aspects in housing. A comprehensive Efficient Housing Renovation Model for the holistic approach of housing renovation will be developed containing various aspects like comfort, space, materials use, "slim bouwen" policies and the use of sustainable energy. [Slimbouwen, 2005]

Result

Applying the Efficient Housing Renovation Model to the existing housing stock should result in an upgraded dwelling providing health and comfort, a significant contribution in the reduction of housing operating cost and the reduction of CO₂ emissions, with the extensive use of existing materials, the existing infrastructure and hence the avoidance of the creation of waste.

References

ECHP, Eurofound, European foundation for the improvement of living and working.
Slimbouwen, Jos Lichtenberg, Aeneas, 2005.