Dynamic dwellings as innovative and sustainable renovation concept

Research Information

Keywords
Sustainable, dynamic concepts, cost-efficiency, living comfort, energy-efficiency, material use

Introduction / Context

In general there is a growing awareness for energy-efficiency which has led to the Flemish energy legislation “EPB” in 2006.

1. Focus on energy-efficient measures lowered our energy consumption but raised new problems
   Higher embodied environmental impact and higher buildings costs because of the large quantity of additional materials and techniques

   In addition the traditional Flemish dwelling has a higher average living space than EU average which has not been taken under consideration by EPB and because of the static nature of the dwelling, insulation and heating system are applied in a way that the whole building volume has to be heated

Question / Goal

These problems and challenges give us an opportunity to respond to the need for change and new housing types

2. Through innovative, sustainable concepts that transform our traditional static dwelling to a more dynamic dwelling
   where the large living space is being used dynamically along the seasons so that it is heated more efficiently, a lower material input is needed and the dwelling becomes more cost beneficial. The optimal comfort and spatial quality must be guaranteed

   The connection between the dwelling, its surroundings and the residents becomes essential

   Exploring the spatial boundaries of the dwelling (dynamic)
   Connecting with the natural elements (seasonal change)
   And supporting and guiding the residents when applying sustainable concepts (behaviour and living pattern becomes important)

Hypothesis / Methodology

Literature study: insights in sustainable building and renovation concepts, the Flemish housing stock, design methods to support residents (living in sustainable and dynamic dwellings) and climate-responsive strategies

Case study: existing cases to be searched and analysed to extract dynamic design strategies and principles and preconditions under which these strategies work and to check their performance on energy, materials, costs, spatial quality

Development of dynamic concepts: through research by design new building concepts are developed and then applied as renovation concepts in the context of shrinkage (underused, detached, single family dwellings)

Supported by workshops with experts and designers, experiments with residents in living labs and the studio’s and thesis’ of students

Evaluation process: a constant interaction with the development and implementation through qualitative (focus groups, interviews) and quantitative research (calculations methods for analysis of comfort, environmental impact, cost efficiency and flexibility).